# AMWD STANDARD WORK PROCEDURE

AUSTRALIAN MINERAL & WATERWELL DRILLING

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AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURHSE 1.01** **Prepared By: Vaughan Cullen**
**Title: Personal Protective Equipment** **Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

**Health Safety & Environment 1.01** **Personal Protective Equipment**

Australian Mineral & Waterwell Drilling is committed to providing a safe work place for all employees, client representatives and others with whom we interact during the course of our work. The company and all employees shall so far as practicable, apply the following steps to Eliminate hazards or reduce hazards to an acceptable level. There by ensuring the work place as safe as possible.

1. **Conduct a "Job Safety Analysis" or "Risk Assessment**, before undertaking any task to determine what if any hazards exist and what the appropriate control measures are.

2. **Eliminate** the hazard if practicable.

3. **Substitute** the hazard with something that creates a lesser hazard.

4. **Engineering** controls. Guards, barricades etc.

5. **Administrative** controls. Job safety analysis, "Written Work Instructions," signage, training, etc.

6. **PERSONAL PROTECTIVE EQUIPEMENT. (PPE)**

### The minimum PPE worn on an operating drill site is:

1. **Hard Hat** of approved type. **Wide brims and neck flaps** should be fitted to hard hats to reduce exposure to the sun.

2. **Safety glasses** clear or tinted with side shields. Prescription lens glasses shall be fitted with side shields.

3. **Shirt with collar**. Shirts shall have no more than the top three buttons undone. Shirt tails shall be tucked into trousers or other wise restrained to prevent the shirt tails becoming caught on equipment. Sleeves may be rolled up to expose the forearm unless other wise prohibited by site rules.

4. **Steel- capped boots**. Must meet Australian standard.

5. **Hearing protection** (ear plugs or ear muffs) shall be worn when the rig and or ancillary equipment is running and at any other time that there is excessive noise. As a guide excessive noise is; when you have to be within 1 metre of another person and shout to make yourself heard.

6. **Sun screen** shall be applied to exposed skin to prevent sun burn.

7. **Gloves** appropriate for the task shall be worn for all manual handling tasks where the possibility of injury to the hands exists.

8. .**Dust masks** shall be worn when.
   1. Mixing mud that is in powdered form and or gives off dust during the mixing process.
   2. Mixing cement,
   3. When drilling with air if mechanical or other dust suppression equipment does not eliminate the dust hazard.
   4. At any time when dust causes a hazard or when directed by site rules or your supervisor.

10. **Full body harness** and lanyard attached to a secure anchor point. Or attached to a fall arrest device that is attached to a secure anchor point.
    Shall be worn when working at heights where a fall could cause injury. (Currently 2m.)
    And or where a fall onto the surface below could cause injury. And or as required by site rules. And or as directed by your supervisor.

11. **When working in cold weather**, care shall be taken to ensure that clothing worn to keep warm is not allowed to be so loose fitting as to create a hazard. If practicable, cold weather clothing should be worn under overalls.

12. **When working in wet weather** and wearing rain coats and or wet weather trousers extra care shall be taken and the work routine adjusted to ensure that the job is carried out safely.

13 **Other PPE** as directed by clients, supervisors or management may be required on some work sites. IE Disposable overalls, high visibility clothing, barrier cream, etc.

14. **Care & Maintenance**. Personal protective equipment is supplied for your safety and is to be used for your protection.

**IT IS YOUR RESPONSIBILITY TO;**

1 Wear the correct PPE for the job you are doing.

2 Look after your PPE, keep it clean, in good repair.

3. Store your PPE safely when not in use.

4 Report any wear and tear, loss or damage to your supervisor.

Personal Protective Equipment is the final line of defence to prevent personal injury in the work place. It is our responsibly to use the correct PPE for the task and ensure that those working with us also use the correct PPE.

**If in any doubt ASK! Your driller or supervisor.**

*Document Number aligned with index*

*"Title" describes what the specific task is. Ie Raising Mast UDR1000*

*Revision Date to check this is the most up to date SWP and it has been revised*

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHGEN 2.08**
**Title: Raising Mast UDR 1000**
**Revision Date: 13th March 2009**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Assessment Team Members: Vaughan Cullen**

*This heading Details who was involved in the process of preparing, approving and carrying out the risk assessment for this SWP.*

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environment) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |

*Step by step details of the job or task*

*Identify **ALL** the hazards in each step*

*Score before hazard control measures and /or activities have been completed*

*Details of Hazard control measures, activities and/or equipment required.*

*Score after hazard control measures have been implemented.*

AUSTRALIAN MINERAL & WATERWELL DRILLING

**No:** **Prepared By:**
**Title:** **Approved By:**
**Revision Date:** **Assessment Team Members:**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environment) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

**No:** **Prepared By:**
**Title:** **Approved By:**
**Revision Date:** **Assessment Team Members:**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environment) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

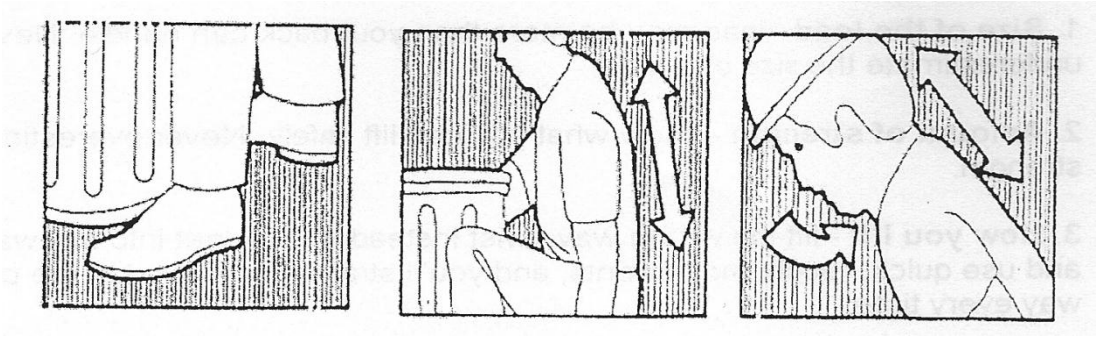
**No: SURHSE1.02**
**Title: Manual Handling**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| **CAN THIS LIFT BE CONDUCTED WITHOUT MANUAL HAJNDLING** | | | | | |
| 1 | Assess weight and size of load. | Injury due to excessive weight awkward size or shape of load. | 21 High | Complete inductions 5<br>Complete a JSA on task if not a standard work procedure. SWP SURHSE 1.01 PPE<br>Team lift or mechanical lift heavy, awkward loads. Complete warm up and stretching exercises prior to commencing task<br>Ask for assistance<br>WARNING<br>READ SAFE LIFTING PROCEDURE BELOW | 5 Low |
| 2 | Complete warm up stretching exercises prior to lifting | | | Ensure Signage is in Place | |
| 3 | Position feet correctly, shoulder width apart. Stand close to load, don't over reach. | | | | |
| 4 | Bend knees and keep back straight. | | | | |
| 5 | Take a firm grip using the base of your hand | | | | |
| 6 | Lift Head, tuck chin in | | | | |
| 7 | Lift smoothly using leg muscles, keeping back straight | | | | |
| 8 | Keep load close to body | | | | |
| 9 | When handling rods, grip with arms spread at a comfortable distance and thumbs facing the same direction | | | | |
| 10 | Make sure load is evenly balanced | | | | |
| 11 | Do not twist your body when lifting – turn by using your feet. | | | | |

# LIFTING PROCEDURE

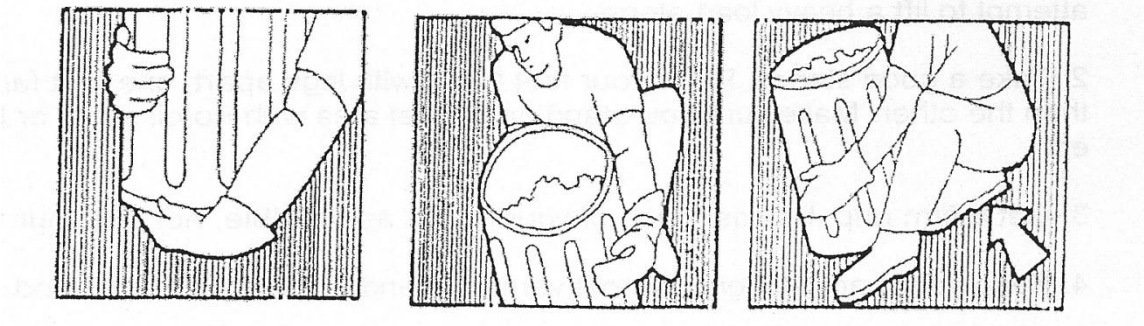
Show work procedure (illustrated below} and have employees practice safe lifting sequence



*1. Feet apart, one behind the other*

*2. Back straight, nearly vertical*

*3. Tuck in chin*



*4. Use entire palm for good grip*

*5. Tuck in arms and elbows*

*6. Start lifting with push from rear foot*

AUSTRALIAN MINERAL & WATERWELL DRILLING

# SAFE LIFTING PROCEDURE

***There are 3 reasons for most back injuries:***

1. **Size of the load** - load may be more than your back can handle. Never underestimate the size of a load.

2. **Amount of strength —** know what you can lift safely. Never overestimate your strength.

3. **How you lift —** lift the wrong way, twist instead of turn, get into awkward positions and use quick, rough, movements, and you'll strain your back. Lift the proper, safe way every time. ·

**When performing lifting tasks, follow these basic rules:**

1. First, test the weight of the load by tipping it. lf in doubt, ask for help. Do not attempt to lift a heavy load alone.

2. Take a good stance. Plant your feet firmly with legs apart, one foot farther back than the other. Make sure you stand on a level area with no oil spots or loose gravel, etc.

3. Get a firm grip. Use as much of your hands as possible, not just your fingers.

4. Keep your back straight, almost vertical. Bend at the hips if you bend.

5. Hold load close to your body. Keep the weight of your body over your feet for good balance.

6. Use large leg muscles to lift. Push up with the foot positioned in the rear as you start to lift.

7. Lift steadily and smoothly. Avoid quick, jerky movements.

8. Avoid twisting motions. Turn the forward foot and point it in the direction of the eventual movement.

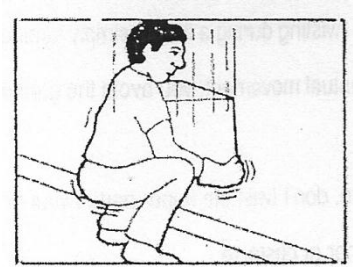
9. Never try to lift more than you are accustomed to.

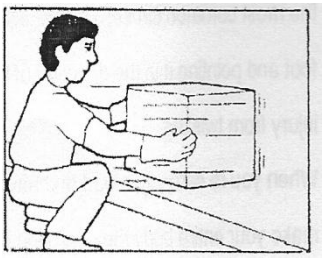
10. Always get help when you have to lift bulky loads.

**Unloading** — To unload, face the spat you have chosen and lower the lead slowly

1. Bend your knees and let your legs, not your back do the work.

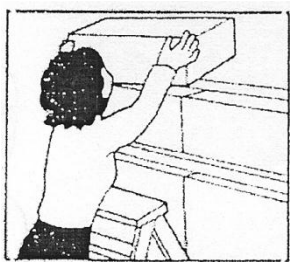
2. Keep your fingers away from the bottom and place the load on the edge of the surface than slide it back





Lifting or lowering from a high plaza.

1. Stand on a sturdy ladder or platform. Never stand on the top rung.



2. Lift the wad in smaller pieces if possible if possible.

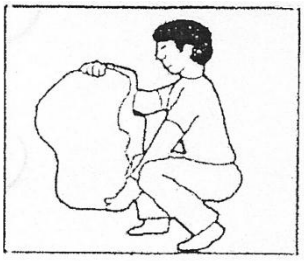
3. Push up on the load to see heavy and stable it is.

4. Slides the load as close to yourself as possible before lifting.

5. Grip firmly and slider it down

6. Get help, if needed, instead of taking risks by yourself. ·

**Awkward objects.**



1. Bend your knees with feet spread.

2. Grip the top outside and bottom inside corners.

3. User your legs to lift, keeping your back straight.

**Warm up before you lift** — bend and stretch gently to get ready.

**THINK** before you lift. Building a good lifting habit or breaking a bad one starts in your head

***TURN. DON'T TWIST.***

AUSTRALIAN MINERAL & WATERWELL DRILLING

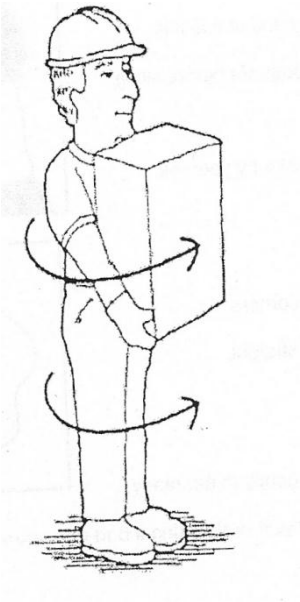
# SAFETY TIPPING
## *AVOID TWISTING MOTIONS*

TO: SUPEVISORS

Give a brief (1-2 minute) safety tip to your employees on how to avoid back injuries. One of the most common causes of back injuries is twisting during a lift. By simply turning the forward foot and pointing it in the direction of the eventual movement, you avoid the greatest danger of injury from twisting.

When you are carrying a load and have to turn, don't twist the upper part of your body, instead make your entire body move around the corner or obstacle.

Remember to TURN, DON'T TWIST



***THE TWIST IS OUT***

When you're carrying a load and have to turn, don't twist the upper part of your body. Make your entire body move around the corner or obstacle. Twisting is the most common cause of back injuries, and the easiest to avoid.

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.03**
**Title: Housekeeping - Work Area**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Identify walkways, work areas & storage are clean and use safety signs where applicable. | Personal injury and or equipment damage. | 24 High | Pre-start Inspections<br>Wear safety equipment, store equipment in designated areas and obey safety signs.<br>Ensure all safety signs are in place<br>Ensure walkways have adequate safety rails and handles.<br>Ensure steps and ladders are secure and handles fitted where needed.<br>Use it then replace it. | 5 Low |
| 2 | Make sure walkways and work areas are kept clear of trip hazards. | Personal injury and or equipment damage. | 22 High | Return tools to designated areas and keep walkways clear of cables, hoses etc. | 2 Low |
| 3 | Make sure walkways and work areas are kept dry. | Personal injury — slip hazard due to wet areas. | 20 High | Dig drainage channels. Use pallets, walkboards or gravel<br>High for sate working surface.<br>Fill in holes, pick up tools, rocks etc that may cause an injury.<br>SWPHSE 1.02 Manual Handling | 2 Low |
| 4 | Make sure all hoses are laid out neatly and in a manner as to minimize traffic over them time. | Personal injury | 12 Moderate | SWPHSE 1.02 Manual Handling<br>Moderate Cover section with dirt that may be walked over all the time. | 2 Low |
| 5 | Clean up spillage of oils & drill mud's etc. | Personal injury — slip hazard | 17 Moderate | Use rags/truck wash to remove spillage refer M. S. D. S.<br>Environmental procedures<br>Spill kits are accessible if required<br>Chemicals are stored according to their MSDS<br>Fuel tanks are labelled and stored correctly. | 4 Low |
| 6 | Clean decking and tools at end of shift. | Personal injury — slip hazard. Equipment Damage | 22 High | Clean tools/Work platform with rags banister brush and truck wash. | 5 Low |
| 7 | Place all rubbish in container/ bin and remove from site at end of shift | Personal injury — trip hazards - Manual - Handling | 20 High | Place rubbish in bin.<br>High Follow safe manual handling procedure<br>SVVPHSE 1.02 Manual Handling<br>All rubbish to be secured for transport<br>As per site and environmental procedure. | 5 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.04** **Prepared By: Vaughan Cullen**
**Title: Housekeeping - Tools** **Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Designate specific storage areas or rack for specific tools.<br>Make sure these areas are safe | Trip hazard | 21<br>High | Return all equipment to designated areas.<br>Refer to SWP SURHSE 1.03 Housekeeping Work Area | 5<br>Low |
| 2 | Make sure storage area is close to where tools will be most frequently used. | Personal injury – Fatigue/strain | 18<br>Moderate | Ensure everyone is aware of designated storage areas.<br>Onsite rig induction. · | 2<br>Low |
| 3 | Clean tools and return to designated storage areas. | Personal injury | 21<br>High | Use rags/truck wash to clean tools.<br>Refer MSDS. | 4<br>Low |
| 4 | Check tools for damage. | Personal injury.<br>Equipment damage. | 18<br>Moderate | Replace or repair as necessary.<br>WARNING<br>Tag out equipment that is faulty<br>**Electrical tools Slings and Lifting Gear must have <u>current</u> inspection tag.**<br>If they need repair they must be tagged out and either repaired by qualified trades person or discarded. | 4<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.05**
**Title: Lock Out all Vehicles and Plant**
(Note: SURHSE 1.05 has replaced SURHSE 106)

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Shut down engine.<br>Ensure all controls are in the neutral or off position.<br>Allow turbo charged engines to idle for five minutes before shutting down.<br>Handbrake on | Equipment damage | 16<br>Moderate | Compressors bleed off the stored air and isolate before starting any work.<br>SWP SURAIR 3.01 Compressor Safety<br>SWP SURAIR Compressor Start UP<br>SWP SURHSE 1.10 Vehicle Daily inspection<br>Refer to Vehicle/Plant manual for additional information | 5<br>Low |
| 2 | Remove ignition key<br>If there is no ignition key go to step 3 | | | | |
| 3 | WARNING<br>**Turn battery isolator to off position and place personal danger tag and padlock on isolator switch.** | Personal injury operating isolated equipment. | 16<br>Moderate | Keep the key in a safe place until the lock can be safely removed. A tag shall be used for each person working on the equipment. | 5<br>Low |
| 4 | Positive test isolation. | | | 4 Test isolation by trying to start the machine. | |
| 5 | Testing | Personal injury<br>Equipment damage | 20<br>High | WARNING<br>**If the equipment needs to be run as part of the maintenance or service or during the period of isolation. A tag shall only be removed after a risk assessment has been completed, conditions of the risk assessment have been met and the risk has been reduced to as low as practicable. If the risk is high DO NOT PROGEED.** | 4<br>Low |

**No: SURHSE1.05**
**Title: Lock Out all Vehicles and Plant**
(Note: SURHSE 1.05 has replaced SURHSE 106)

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010 Reviewed By: Lawrie Lorrigan**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 6 | Remove personal danger tag. | | 12 Moderate | WARNING<br>Only remove lock and personal danger tag when it is safe to do so. Or at the end of your shift, or you are no longer working on that machine. If the machine is still not in a safe condition to operate when you remove your personal danger tag Place an out of service tag on the machine battery isolator.<br>**Don't forget to remove your personal danger tag and replace it with an out of service tag if machine is still defected at end of shift.** | 5 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.07**
**Title: Isolation Procedures Compressor**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Shut Compressor down | | | SWP SURAIR 3.01 Compressor Safety<br>SWP SURAIR 3.02 Compressor Start Up | |
| 2 | Bleed off any built up pressure | Noise, dust, high pressure air | 21<br>High | WARNING<br>**A HIGH PRESSURE AIR IS DANGEROUR AND CAN RESULT IN DEATH**.<br>Refer to Operators manual<br>SVVP SURAIR 3.01 Compressor Safety<br>SVVP SURAIR 3.02 Compressor Start Up<br>Wear appropriate PPE<br>Signage and awareness of **no go areas.**<br>Do not allow any body part to be in the path of the high pressure air as in vents | 5<br>Low |
| 3 | Switch battery isolator key to off position | | | SVVP SURHSE 1.05 Isolation Lockout<br>WARNING<br>Turn battery isolator to off position and place personal danger tag on isolator switch. | |
| 4 | Place isolation Tag over battery Isolator. | | | WARNING<br>If the equipment needs to be run as part of the maintenance or service or during the period of isolation. A tag shall only be removed after a risk assessment has been completed, conditions of the risk assessment have been met and the risk has been reduced to as low as practicable. If the risk is high DO NOT PROCEED**.** | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURHSE1.07**
**Title: Isolation Procedures Compressor**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 5 | When job or task is completed remove all tags. | Ensure personnel to remove only their locks and no one else's. | 20 High | WARNING<br>Only remove personal danger tag when it is safe to do so. Or at the end of your shift, or you are no longer working on that machine. If the machine is still not in a safe condition to operate when you remove your personal danger tag. Place an out of service tag on the machine battery isolator. | 5 Low |
| 6 | Switch Isolation on | | | | |
| 7 | Before starting compressor ensure crew is clear of machine. | Any thing loose or undone could become a flying object<br>Uncontrolled release of high pressure air. | 17 Moderate | SWP SURAIR 3.01 Compressor Safety<br>SWP SURAIR 3.02 Compressor Start Up<br>Wear appropriate P.P.E<br>Pre—start inspections<br>Signage and awareness of **no go areas.**<br>Do allow any body part to be in the path of the high pressure air IE; as in vents<br>Maintain visual contact of all crew members ensure they are in a safe area. | 5 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.08**
**Title: Shift Change and Cross Shift Handover**
(Note: SURHSE 1.08 has replaced SURHSE 1.09)

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010 Reviewed By: Lawrie Lorrigan**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Prior to leaving drill site ensure rig and ancillary equipment has been re fuelled. | Equipment damage - breakdown | 17 Moderate | Compliance with Refuelling engines<br>SWP SURGEN 2.02 Refuelling Engines | 5 Low |
| 2 | Clean and return to their designated area all tools that have been used during the shift.<br>Ensure all housekeeping duties have been met. | Personal injury faulty tools | 17 Moderate | SWP SURHSE 1.03 Housekeeping Work Area<br>SWP SURHSE 1.04 Housekeeping Tools<br>Read MSDS on chemicals if being used for cleaning. | 5 Low |
| 3 | Have at least six rods, cleaned, greased and ready to go. | | | Gloves<br>SWP SURHSE 1.02 Manual Handling.<br>SWP SURGEN 2.19 Stilson Use. | |
| 4 | Day shift carry out pre start on lighting Plant and start ready for night shift. | | | | |
| 5 | Load core on to light vehicle.<br>***If required by client*** | Personal injury lifting –strain back | 20 High | Two man lift<br>Use correct manual handling procedures<br>Gloves I<br>SWP SURHSE 1.02 Manual Handling. | 8 Moderate |
| 6 | Ensure all paper work has been filled out correctly | Incorrect in formation recorded. | 17 Moderate | Strictly adhere to Company report writing procedures and practices. When in doubt ask Supervisor. | 8 Moderate |
| 7 | Mark up the next 5 core trays | Incorrect in formation recorded. | 17 Moderate | Ensure the last core block is marked up and is in the correct place in the core tray.<br>Wear correct PPE - gloves. Follow client instructions for correct mark up of tray.<br>Place empty core tray on racks suitable for the weight of core and to minimize manual handling of crew and client<br>Ensure legible writing<br>Ensure tray is clean of contain aments.<br>SWP SURDIA 5.08 Empty Core Tubes and Wash Core. | 8 Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.08**
**Title: Shift Change and Cross Shift Handover**
(Note: SURHSE 1.08 has replaced SURHSE 1.09)

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010 Reviewed By: Lawrie Lorrigan**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 8 | Fill mud tank and mix mud | Personal injury lifting - strain<br>Chemical burns and eye injury | 20<br>High | Use correct manual handling procedures.<br>High Wear specified PPE as per MSDS sheets<br>Ensure walkways and ladders are secure and in place.<br>SWP SURHSE 1.02 Manual Handling. '<br>SWP SURMUD 2.17 Mix Mud. | 5<br>Low |
| 9 | Ensure the site is clean and tidy | . Environment- pollution | 17<br>High | Rubbish correctly disposed of or securely loaded on to light vehicle. | 3<br>Low |
| 10 | Obtain copy of Hand Over Sheet<br>**The cross shift hand over sheet is used b crew members and personnel responsible for the rig that they are working on**. | Unable to find Hand Over Sheet<br>Transferring incorrect information to cross shift | 16<br>Moderate | Spare copy's located in site office<br><br>Transfer the correct information to your cross shift at shift change meetings. | 5<br>Low |
| 11 | Write a list of parts and Consumables needed for next shift. Any other requirements of client, supervisor or driller. | Incorrect information recorded | 20<br>High | Strictly adhere to Company report writing procedures and practices. | 8<br>Moderate |
| 12 | Drive to accommodation or designated shift change area. | Personal injury — vehicle accident not driving to conditions. not being clearly visible to other traffic. | 20<br>High | Ensure hazard signs in place and hazard lights operating. Drive to conditions. Meet with cross shift and supervisor. High Ensure licensed for the vehicle being driven. | 5<br>Low |
| 13 | Change over with next crew. | Incorrect information being given leading to contract and performance error.<br>Personal injury due to wrong instructions being given. | 17<br>Moderate | Briefly describe the shifts activities, highlight any problems that you had and how they were overcome. Pass on all relevant information. Hand over list of parts and consumables required | 5<br>Low |
| 14 | Travel to drill site | Equipment Damage | 17<br>Moderate | Carry out pre start on light vehicle.<br>Load and secure stores<br>Drive to conditions | 3<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURHSE1.08**
**Title: Shift Change and Cross Shift Handover**
(Note: SURHSE 1.08 has replaced SURHSE 1.09)

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 15 | Arrival at Drill Site | Equipment damage | 17<br>Moderate | Park Light vehicle safely and check drill site.<br>Carry out pre start checks.<br>Start Drilling. | 3<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.10**
**Title: Vehicle Daily Inspection**
(Note: SURHSE 1.10 has replaced SURHSE 1.11 & 1.12)
**Reviewed By: Lawrie Lorrigan**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | ***Light Vehicle Daily inspection ( Vehicle Pre start): I***<br>At the start of every shift a pre-start will be conducted and all findings recorded in the Pre start book. The top copy of the report will be handed to your supervisor and any defects reported before going underground The purpose of the pre-start is to determine that the vehicle is safe to operate and that any defects are repaired before the vehicle becomes unsafe to operate. Thus keeping your vehicle in good condition, eliminating incidents and downtime due to unsafe conditions.<br>Vehicles:<br>AMWD has numerous types of vehicles in its fleet; these vehicles differ in there servicing requirements.<br>Ensure you consult the service manual, supervisor or maintenance supervisor for the servicing requirements for the vehicle you are responsible for. | | | | |
| 2 | | | | Ensure vehicle is isolated before going through check list | |
| 3 | Checking engine oil | Hot oil<br>Oil Spillage | 8 | Allow engine to cool before checking oil Use a clean rag to wipe oil from dip stick. Use funnel top up oil if required<br>Consult operator's manual for correct oil type.<br>***IF IN DOUBT ASK!***<br>Clean up as per MSDS | |
| 4 | Checking clutch & Brake Fluid | Spillage | 8 | Consult operator's manual for correct type of fluid.<br>***IF IN DOUBT ASK!***<br>Do not over fill reservoirs.<br>Clean up as per MSDS | |
| 5 | Checking Coolant level | Hot Coolant<br>Burns | 8 | Do not remove radiator cap if engine is hot.<br>Check fluid level in the expansion bottle, do not overfill passed the full level.<br>Use correct type of coolant.<br>***IF IN DOUBT ASK!*** | |
| 6 | Checking vee Belts | Hot engine parts | 4 | Allow engine to cool if hot.<br>Visually check vee belts for wear.<br>Check operator's manual for correct tension and instructions. | |
| 7 | Checking Hoses and fuel lines | Hot engine parts | 8 | Allow engine to cool. Visually check hoses and fuel lines for leaks. | |
| 8 | Checking Undercarriage | | | Check Chassis for cracks and excess rust check brake lines and fuel lines for leaks. Inspected springs and shock absorbers for defects. Under<br>l carriage should be clean and free of mud | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.10**
**Title: Vehicle Daily Inspection**
(Note: SURHSE 1.10 has replaced SURHSE 1.11 & 1.12)
**Reviewed By: Lawrie Lorrigan**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010**

| ***STEP*** | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|

**Example: Operator Pre-Start Checklist**

AUSTRALIAN MINERAL & WATERWELL DRILLING

OPERATOR PRE-START CHECKLIST

LIGHT VEHICLES

| Date: 12/5/06 | Unit No. *Lv00084* | Shift; Day | Operator: *Nicu. J* |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Engine Off** | ✓ | | ✓ |
| Check for out of service tags or personal tags | ✓ | Check horn operation | ✓ |
| Check Vee Belts | ✓ | Check engine oil pressure | ✓ |
| Check Engine Oil Level | ✓ | Check steering operation | ✓ |
| Check Coolant level (if cold) | ✓ | Check gauges and indicator lights | ✓ |
| Check air filter indicator and filter assembly | ✓ | Check operation radios | ✓ |
| Check exhaust ducting and connections | ✓ | Check jack | ✓ |
| Check all hoses and fuel lines visually | ✓ | Check wheel brace | ✓ |
| Check all components for oil leaks | ✓ | Check spare tyre | ✓ |
| Check tyres and wheel nuts | ✓ | Check springs front and back | ✓ |
| Check fire extinguisher | ✓ | Check reverse beeper | ✓ |
| Check fuel level | ✓ | Check reverse light | ✓ |
| Check tyre pressure | ✓ | Check beacon light | ✓ |
| Check for first aid kit | ✓ | Check Strobe light | *N/A* |
| Check seat belt condition | ✓ | Check high beam | ✓ |
| Check condition of seats | ✓ | Check low beam | ✓ |

☑ Tick for standard (O.K.) ☒ For Substandard (U/S) Hour Metre Reading *149366*

| | POOR | OK | | |
|---|---|---|---|---|
| Cleanliness Condition of Cab (including windscreens) | | ✓ | Record Odometer reading | |

**Report all defects I substandard conditions immediately to shift supervisor / fitter.**

| Defects/Substandard Conditions (if any) | Is Vehicle safe to operate YES / NO |
|---|---|
| | Operator's Signature: |
| | |
| | Card checked and all defects have been rectified |
| | Signed |
| | (Project Mechanical superintendant or nominee) |
| Date & Time / / am/ pm. | |

| | |
|---|---|
| **Parking Brake Test**<br>Engage second gear, apply the park brake — Accelerate the engine. Brakes should hold at 175O RPM | **RECORD**<br>*Passed* |
| **Service Brake Test**<br>Press brake pedal, engage first gear and accelerate the engine — Brakes should hold at 1750 RPM | **RECORD**<br>*Passed* |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.13**
**Title: Operating Salamander Heater**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | All flammable materials (paper/rags etc) in drill shacks (sheds) are to be removed prior to lighting | Personal injury bums<br>Equipment damage fire | 25<br>High | Ensure that area ls clear of all potential fire hazards prior to lighting.<br>Ensure tire extinguisher is readily available and has been Serviced. | 7<br>Moderate |
| 2 | Ensure unit is on a level base | Manual handling injuries | 22<br>High | Use correct manual handling techniques<br>SVVP SURHSE 1.02 Manual handling | 4<br>Low |
| 3 | Ensure flue is firmly secure | | | | |
| 4 | Ensure filter cap/vent is serviceable | | | | |
| 5 | Fill Fuel Bowl to approximately 80 % | | | Adhere to environmental procedures on spillages<br>Read MSDS on diesel and follow its handling instructions | |
| 6 | **Ensure butterfly V/V is latched open** | Hand injuries | 11<br>Moderate | Wear Gloves | 4<br>Low |
| 7 | Light Unit | | | | |
| 8 | VVhen unit is lit close cap/vent ensuring 3 vent openings are visible | | | | |
| 9 | VVhen shutting down —- half an hour prior to end of shift, ensure butterfly valve and vents are closed<br>WARNING<br>**NEVER REFILL OR RELIGHT SALAMANDER IF IT IS BURNING OR IS HOT FROM USE. ALLOW TO COOL** | Hand injuries | 20<br>High | Wear gloves and eye protection | 4<br>Low |
| 10 | Cleaning Salamander | | | Ensure salamander ls cold<br>Follow MSDS and environmental procedures for disposal of waste materials<br>PPE gloves eye protection and dust mask. | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.14**
**Title: Chemical Handling**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Prepare to use chemicals, Before using any chemical, ensure the Material Safety Data Sheet (MSDS) has been read thoroughly. | Personal injury non-compliance with MSDS information. Burns, chemical inhalation. | 20 High | If any doubts exist, ask the supervisor for advice in the use of the chemical, handling and the correct Personal Protective Equipment (PPE) to be worn. | 10 Moderate |
| 2 | Select and fit PPE | Personal injury non-compliance with MSDS information. Burns | 20 High | Ensure you have adequate PPE (eg. Wet weather gear, Respirator, Gloves etc., if necessary) so that no direct skin contact occurs or dangerous vapours are inhaled. Apply medicated skin cream to any exposed areas if required. | 8 Moderate |
| 3 | Select correct applicator | Personal injury non-compliance with MSDS information. Burns | 16 Moderate | Ensure the correct applicator is used, such as a spray bottle or other devices to ensure the chemical is correctly applied to the equipment. | 8 Moderate |
| 4 | Use with other chemicals | Personal injury non-compliance with MSDS information. Burns | 20 High | Ensure there Is no “mixing" of any chemicals, unless the MSDS and/or instructions advise it is safe to do so. | 8 Moderate |
| 5 | Apply chemical | Personal injury non-compliance with MSDS information. Burns | 16 Moderate | Apply the chemical to the equipment and wall for the specified reaction to take place. | 5 Low |
| 6 | **Clean up** | Personal injury non-compliance with MSDS information. Burns, chemical inhalation. | 16 Moderate | When finished with the chemical ensure it is stored in a safe place. When removing correct PPE, ensure there is no skin contact with the chemical and wash PPE with clean water only. Follow MSDS | 5 Low |
| 7 | Disposal of ‘used’ containers and contaminated PPE | Personal injury. Environmental Damage. | 20 High | Dispose of ‘used' containers according to local, mine site or state regulations and MSDS. | 8 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.15**
**Title: Travelling Between Sites in Remote Areas**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

**Vehicle suitability**

Things to consider

- ls the vehicle suitable for the route to be travelled?
- ls it capable of safely carrying the required load and/or number of passengers?
- Is it equipped with sufficient spare parts,wheels, first aid kit, water and emergency provisions for the journey?
- Is it equipped with a means of communication in the event of a breakdown?
- Has the vehicle been maintained to a suitable standard that will provider reliability?

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | **After reading the above ensure the five points can be achieved.** Service end check out vehicle and ensure spare wheel, Jack, First aid Kit, Spare parts Hand tools, communication equipment water and emergency provisions are in the vehicle. Lifting device for spare tyres and trucks. | Personal Injury<br>Back Injury<br>Incorrect tools | 20<br>High | SVVP SURHSE 1.10 Vehicle inspection<br>Correct use of hand tools and correct size tools<br>Use lifting device for spare tyre<br>**Carry Drinking water**<br>**Adhere to the five points of travel.** | 4<br>Low |
| 2 | Advise necessary personnel and supervisor route to be taken and anticipated arrival time. Set up schedule for phone calls | | | WARNING<br><br>Ensure trip details are given to the necessary personnel and the supervisor.<br>If this can not be achieved then the closest AMWD department must be notified.<br>Don't change trip plans unless you have notified one of the above.<br>Schedule Phone calls for long trips | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURHSE1.15**
**Title: Travelling Between Sites in Remote Areas**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 3 | During the trip ensure reel breaks are taken regularly and logbook is filled in correctly. Drive according to weather and road conditions. Make phone calls at schedule times | Motor Vehicle accident due to fatigue | 24<br>High | Ensure trip is planned and breaks are taken according to national drivers Log book.<br>Drink plenty of water. | 16<br>Moderate |
| 4 | On arrival inform necessary personnel, supervisor or AMWD office. Contact departure site to advise of arrival.<br>WARNING<br>**Read attached documents on Remote Hazards** | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURHSE1.15**
**Title: Travelling Between Sites in Remote Areas**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

### Remote Area Hazards

Consideration should be given lo the following points:

***Roadtrains***

These are common in the Northern Territory and can he up to three trailers (50 metres} long. They are not confined to the bitumen and will be encountered on dirt roads. Always give them plenty of room and when overtaking, allow all least l km of clear road ahead.

Dust on outback roads can obscure a driver's vision. Take great care if overtaking.

***Wandering stock and wildlife***

The majority of Northern Territory roads are not fenced. Cattle horses, kangaroos, donkeys, buffaloes and even camels may be found crossing the roads particularly early in the morning and late in the afternoon. They may also be found standing in the middle of the road al night. Drivers should slow down and treat all animals on the road or roadside with caution. Do not expect animals to automatically move out of the way. Birds may also be a problem especially if they are feeding on the bodies of other animals killed on the road.

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURHSE1.15**
**Title: Travelling Between Sites in Remote Areas**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

***Night driving***

Night driving should he avoided if at all possible. However it night driving is necessary, the vehicle should he checked to ensure its lights are adequate. A driver required to travel at night should be reminded to reduce his/her speed so that he/she can stop safely if required to do so in an emergency.

***Driver fatigue***

The driver should he reminded that it he/she feels tired or drowsy they should stop driving and have a break, Breaks of 10 minutes or so should be taken every 3 hours in any case. Driver fatigue is one of the most common causes of single vehicle accidents.

***Floods***

The driver should he instructed not to attempt to cross flooded bridges or causeways unless they are absolutely sure of the depth of water over the road and know if there are any submerged obstacles or road damage. Drivers should also be aware of the danger that swift flowing water presents. Most flash floods recede within 24 hours. Listen to radio reports in the wet season.

***Breakdowns***

in the event of a breakdown the driver should be instructed to stay with the vehicle and be reminded that a missing vehicle is much easier to find than a missing person. As temperatures in the Territory can be in both extremes, it is important to remind the driver to stay in the shade or under shelter. Employers and drivers should also ensure that prior to departing there is an ample supply of water in the vehicle.

***Service and fuel***

Prior to departing drivers must be given information on the availability of fuel and vehicle repair outlets such as opening times, distances, location and credit card facilities.

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.16**
**Title: Emergency procedures – Gas Intersection Diamond and Mud Rotary**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**

**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Stop drilling – Leave pump running at same speed | Gas bubbles may be flushed back to surface | 25 High | Shut down any ignition source around bore hole collar and observe no smoking signs. | 12 Moderate |
| 2 | Note exact depth of hole and exact time of day and advise Supervisor | | | | |
| 3 | Notify client representative and supervisor | | | | |
| 4 | WARNING<br>**DO NOT approach the rig until detectors are available to monitor the gas** | | | | |
| 5 | Monitor gas around bore collar and work area | Escaping gas fire explosion | 24 High | If only small bubbles of gas emerging as circulated to surface it will be safe to resume drilling. | 8 Moderate |
| 6 | Stop pump and pull inner tube from hole | Swabbing hole | 20 High | WARNING<br>**Pull tube slowly and top up annulus with drilling fluid.** | 4 Low |
| 7 | Remove shut off valves from inner tube backend and replace with steel spacers. | Personal injury | 20 High | Correct use of hand tools | 7 Low |
| 8 | **Pump inner tube to bottom and resume drilling.** | Small bubbles of gas may continue to be circulated out of hole with drilling fluid | 21 High | Use bug blower to control ventilation around drill hole collar | 7 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURHSE1.16**
**Title: Emergency Procedures – Gas Intersection**
**Diamond and Mud Rotary**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010 Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 9 | Continue drilling as normal under the controlled conditions. | Further gas intersections | 22 High | Continually inspect core for further signs of disking. Monitor level of sumps for increased volume of water return that could indicate that gas is pushing the fluid out of the hole. Inform Supervisor and Client<br>WARNING<br>Continually monitor Gas readings throughout hole. Ensure any tripping of rods, pulling of tubes, survey equipment and orientation equipment the annulus is being filled with water.<br>Ensure all ignition sources are kept at a minimum 10 meters from the collar. | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.17**
**Title: Unpack New Rods**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Ensure work area is free of hazards | Personal Injury. Slip, trip | | Work area shall be level clear and free of hazards. Enough space to allow rods to roll out 1 layer high when they are released from the binding step. Work area may be the ground or a truck deck.<br><br>SWP SURHSE 1.03 Housekeeping Work area | |
| 2 | Place roll stops. | Personal Injury -lifting | | Correct manual handling.<br>SWF SURHSE 1.02 Manual Handling<br>Roll stops can be star pickets driven into the ground. Blocks of wood or other suitable items that will prevent the rods rolling in an uncontrolled manner when the binding strap is cut. | |
| 3 | Restrain binding strap | | | Binding strep on each side of out shell be restrained by a heavy object ie wooden block that shall prevent the cut ends of the binding strep from moving in an uncontrolled manner when the cut is made.<br>PPE: gloves, eye protection | |
| 4 | Cutting sequence. | | | If bundle has end caps remove these first. Cut the inner or middle straps first, Cut end straps last and from a position beyond the end of the rods, clear of the area where the rods have potential to roll when the last binding strap is cut.<br><br>WARNING<br><br>ONCE CUT, THE RODS HAVE THE POTENTIAL TO ROLL UNCONTROLLABLY. ENSURE SUFFICIENT CHOCKING AND STAND A SAFE DISTANCE FROM STACK. 1<br>PEE; gloves, eye protection | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.17**
**Title: Unpack New Rods**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 5 | Cutting Tool | | | Cutting tool such as side cutters or tin snips is best. A pair of shifting spanners closed tight on strap. Handles opposing each other in a near to horizontal position. Then handles bought up to meet will also out the binding strap. A crow bar placed under the strap and used as a lever will also break the strap while you are standing at a safe distance.<br>WARNING<br>**ONCE CUT, THE RODS HAVE THE POTENTIAL TO ROLL UNCONTROLLABLY. ENSURE SUFFICIENT CHOCKING AND STAND A SAFE DISTANCE FROM STACK.**<br>PPE: gloves, eye protection | |
| 6 | Cut binding strap. | Personal Injury – cuts. Rods rolling uncontrolled when strap is cut | | Ensure strap of each side of cut is restrained. Ensure roll stops are in place.<br>PPE: gloves, eye protection | |
| 7 | Completion of Unpacking | Personal Injury. Lifting<br>Rods rolling | | Ensure roll stops are secure. If required move individual rods to new location ready for use, Place out binding strap with rubbish for later disposal.<br>Dispose of rubbish as per environmental and site procedures | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.18**
**Title: Emergency procedures – Drill Rig Fire**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Stop rig operation, rotation, feed water pump etc | Personal injury & equipment damage<br>High pressure hydraulic oil could fuel fire causing. | 25<br>High | Shut down any ignition source.<br>Prepare fire breaks<br>Setup wash down hose | 4<br>Low |
| 2 | Shut down drill rig | Personal injury radiant heat, fumes, burns poor visibility | 23<br>High | Endure all flammable substances are relocated out of fire path.<br>Ensure adequate fire breaks are implemented. | 4<br>Low |
| 3 | **Evacuate the immediate area** | Personal injury radiant heat, fumes, burns poor visibility | 23<br>High | WARNING<br>**Clear area of all personnel to designated emergency assembly area upwind from the fire.**<br>**Conduct head count** | 4<br>Low |
| 4 | Notify emergency response team, client representative and/or fire | | | Inform mine of emergency via radio in line with client emergency procedures. | |
| 5 | Extinguish Fire | Personal injury radiant heat, fumes, burns poor visibility. | 24<br>High | Stay up wind do not open any closed coverings as this may cause fire to develop particularly if fire is near the fuel tank.<br>Retreat to designated assembly area. | 9<br>Moderate |
| 6 | Re-entry of site following extinguishing of fire | Personal and Equipment<br>Re ignition of tire tank explosion. | 24<br>High | Wait until site has been inspected by mines rescue or trained and competent personnel. | 8<br>Moderate |
| 7 | Continuing drilling as normal | Equipment damage following fire | 17<br>Significant | Continually inspect area and equipment for further signs of damage or fire risk. Inform Supervisor. | 4<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.19**
**Title: Emergency procedures – Gas Blowout**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Stop drilling - leave water pump running at same speed | | | | |
| | WARNING<br>**IF SAFE TO DO SO. BLAST THE HORN ON THE RIG NOTIFY CREW AND EVACUATE THE AREA IMMEDIATELY TO THE DESIGNATED MUSTER POINT. 1** | Personal injury<br>Equipment Damage | 25<br>High | Conduct emergency procedure evacuation drills regularly.<br>One long loud blast on the horn would indicate gas levels in the hole are at an unacceptable level and all crew need to be evacuated to the muster point.<br>Muster point is 50 meters upwind from the rig<br>**Conduct a head count**<br>Ensure all signage is in place<br>Ensure all ignition sources are not within 10 meters of the rig collar at all times<br>Ensure LEL gas monitors are serviced, charged and calibrated as per manufactures instructions<br>Ensure all fire equipment is serviceable<br>Ensure Washington rubber is not leaking<br>Pre—Start Inspections | 12<br>Moderate |
| 2 | **Note exact depth of hole, exact time of day and the gas reading that was recorded advise Supervisor and client.** | | | Low warning level on gas monitor is set at 10 LEL or 0.5 %<br>High warning level on gas monitor is set at 50 LEL or 2.5%<br>Of gas in the atmosphere | |
| 3 | WARNING<br>Once Supervisor and/or client arrive a risk assessment will be conducted to assess the best way to monitor the situation. | Personal injury<br>Equipment Damage | 25<br>High | Ensure all ignition sources are not within 10 meters of the rig collar at all times.<br>Ensure LEL gas monitors are serviced, charged and calibrated as per manufactures instructions<br>Conduct a head count.<br>If gas is still being recorded on the monitor move further away upwind.<br>Consider contacting emergency response team and fire brigade if an explosion is imminent. | 8<br>Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURHSE1.19**
**Title: Emergency procedures – Gas Blowout**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 4 | Once safe to do so a nominated person will monitor the gas readings and record them on the gas sheets. | | | | |
| 5 | A heavy brew of drilling fluids will be pumped down the hole | | | A typical brew would consist of:<br>Barytes,Pac,Liquipol, Lithium gum,Gel,Safe lube or Seam drill<br>An example of mixing proportions would be;<br>Lithium gum 10 kg<br>Pac 5kg<br>Safe lube 1lts<br>Barites 35 kg<br>Per 1000lts<br>Or<br>Gel 10kg<br>Pac 5 kg<br>Liquipol 5 lts<br>Barites 35 kg<br>Per1000lts<br>Ensure all ignition sources are not within 10 meters of the rig collar at all times<br>Ensure LEL gas monitors are serviced, charged and calibrated as per manufactures instructions<br>Monitor gas levels whilst mixing mud.<br>SWP SURGEN 2.17 Mix Mud | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURHSE1.19**
**Title: Emergency procedures – Gas Blowout**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 6 | Monitor gas around bore collar, blooie line and work area | Escaping gas fire explosion | 24<br>High | Continue gas monitoring<br>Look for change in gas levels once heavy drilling fluids have been returned.<br>Ensure all ignition sources are not within 10 meters of the rig collar at all times<br>Ensure LEL gas monitors are serviced, charged and calibrated as per manufactures instructions<br>Monitor gas levels whilst mixing mud. | 8<br>Moderate |
| 7 | Once gas levels return to normal continue drilling under the controlled conditions from the risk assessment | Personal Injury<br>Equipment damage | 24<br>High | Follow procedure from risk assessment and<br>Monitor and record gas levels every 15 Minutes<br>WARNING<br>**Continually monitor Gas readings throughout hole.**<br>**Ensure any tripping of rods and survey equipment the annulus is being filled with water.**<br>**Ensure all ignition sources are kept at a minimum 10 meters from the collar.**<br>**Check condition of Washington rubber.** | 4<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.21**
**Title: Use of Gas Detector-LEL**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Ensure monitor battery has been replaced with fully charged battery, Must be able to last 12 hour shift. | Productivity loss due to incorrect battery being placed in monitor | 1<br>Very Low | Ensure charged battery is placed in detector.<br>Ensure tagging of electrical equipment.<br>Low battery warning results in a battery symbol on the screen and a low short beep. | 0<br>Very Low |
| 2 | Switch on monitor in fresh air and run fresh air calibration.<br>WARNING<br>**Ensure monitor is calibrated and fully charged.** | Failure to follow step, resulting in incorrect reading down hole. | 1<br>Very Low | Follow steps 2&3 | 1<br>Very Low |
| 3 | WARNING<br>**Ensure LEL settings are correct land the filter is dry.** | Failure to follow step, resulting in incorrect reading down hole, | 1<br>Very Low | Follow steps 2&3<br>Ensure all signage is in place<br>Ensure all ignition sources are not within 10 meters of the rig collar at all times.<br>Ensure the housing has not been damaged as this can affect the monitor<br>Ensure LEL gas monitors are serviced, charged and calibrated as per manufactures instructions<br>Low warning level on gas monitor is set at 10 LEL or 0.5 %<br>High warning level on gas monitor is set at 50 LEL or 2.5% of gas in the atmosphere<br>Gas warning from the detector shows the reading on the screen and sends out a short loud beep. | 1<br>Very Low |
| 4 | At completion of shift remove old battery and replace with new for ongoing shift. | Electric shock | 14<br>Moderate | Turn charger off before removing and replacing batteries<br>Ensure tagging of electrical equipment<br>Ensure filter stays dry | 2<br>Very Low |
| 5 | Place old battery on charge and make sure charger is switched on. | Electric shock, equipment damage ie pins on battery. | 14<br>Moderate | Turn charger off before removing and replacing batteries<br>Ensure tagging of electrical eguipment | 2<br>Very Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE1.24**
**Title: Secure Load Site Move**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Prepare for the site move. | Personal Injury Vehicle roll over.<br>Equipment damage<br>Breach 0f mine regulations | 17<br>Moderate | Anyone driving a truck must have the appropriate licence for the vehicle being used and be authorised to drive on the mine site.<br>Do not move any truck, which has an unsecured load. | 5<br>Low |
| 2 | WARNING<br>Secure load. | Personal injury. Equipment damage. | 17<br>Moderate | Stack rods evenly by: `<br>Inserting smaller diameter rods inside the larger pipe.<br>Spreading pipe out evenly across the row.<br>If not appropriate with the larger diameter rods in the centre and smaller diameter rods either side outwards.<br>Inspect tie down equipment for condition and load capacity. Any load of rods must be secured with at least two rated ratchet straps which are tightly tied down.<br>**Ensure Rod Sloop is secured**<br>Refer to SURHSE 1.02 Manual handling | 5<br>Low |
| 3 | WARNING<br>**Select Low Gear**<br>Driving up a steep hill or off road situation<br>Select low gear before starting up the hill as changing gears may jerk the load enough to cause rods to slide off. | Personal injury. Equipment damage. | 17<br>Moderate | Driving up steep hills the following precautions apply:<br>In an off—road situation it may be advisable to reverse up steep hills. Try to avoid having to stop when driving forwards up steep hills, as the jerking of stopping or starting may cause rods to slide off. | 8<br>Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.01**
**Title: Acquire equipment for Mobilisation**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Contact Regional Manager or his designate to clarify scope of work and correct equipment tor respective contract. | Mobilizing wrong equipment for respective contract.<br>Gear required not available. | 18<br>Significant | Double check correct equipment is loaded<br>Organize correct gear to be forwarded to next contract site<br>Contact Personnel in step one | 8<br>Moderate |
| 2 | Find out local site requirements. Obtain copy of client inspection check lists. | Arriving on site, finding equipment does not meet client standards. | 18<br>Significant | All equipment going to the job shall be inspected using both AMWD and client check lists. Any faults shall be rectified prior to equipment leaving for the jobs.<br>Organize correct gear to be forwarded to next site. | 1<br>Low |
| 3 | Obtain copy of mobilisation form. | No record of mobilised equipment | 18<br>Significant | Respective branches to provide mobilisation forms. | 5<br>Low |
| 4 | Source, acquire and check equipment at respective branches. | Not knowing where to obtain supply for contract.<br>Mobilisation detect equipment<br>Using other contracts equipment<br>Not recording mobilisation | 18<br>Significant | Do Mobilisation with stores personnel at respective branches<br>Complete a detailed inventory of all equipment that is going to the job.<br>Ensure all equipment is in good working order and service up to date.<br>Correct any faults before leaving. | 8<br>Moderate |
| 5 | List equipment gathered on mobilisation form. | No record of mobilised equipment | 12<br>Moderate | Complete mobilisation forms Ensure all equipment has been inspected and faults rectified.<br>Conduct a Rig Audit | 4<br>Low |
| 6 | On completing mobilisation requirements, photo copy mobilisation form | No record of mobilisation form l tor branch and contract. | 8<br>Moderate | Copy to Branch<br>Copy with mobilised equipment | 4<br>Low |
| 7 | Carry out pre start on all vehicles and equipment. | Vehicle or equipment breaks down in transit or on site. | 18<br>Significant | Ensure all road vehicles have registration and all documentation is current. All drivers shall hold the correct it class of licence for the vehicle they are driving.<br>Conduct a Rig Audit and Equipment inspection. ` | 4<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Repair Vehicles | Not competent in task<br>Wrong parts received | 18<br>Significant | Order parts/equipment required.<br>If necessary request a fitter in advance.<br>Write a J.S.A on each specific task.<br>Ensure competency level has been achieved to conduct task | 4<br>Low |
| 2 | WARNING<br><br>**Load and secure all equipment.**<br>Check weight and size, arrange permits if required. | Loss and or damage to equipment in transit. Vehicles over size and or weight. | 21<br>High | If possible all vehicles should be weighed to ensure they comply with state and territory laws If a weigh bridge is not available, then it will be necessary to accurately estimate the weight of the load using all available information.<br>Read and follow SURGEN2.04 Securing loads Site Move | 8<br>Moderate |
| 3 | Travel plan. | Drivers getting lost. Vehicle accidents. Break down. | 21<br>High | Supervisor shall brief all personnel travelling to the job on road safety, the planed route, communications, what to do if becoming separated or lost, break down, rest breaks, food and accommodation en—route. | 5<br>Low |
| 4 | Prior to arrival on site | | | Supervisor shall contact the client representative and arrange a time, place to meet and best location to park the vehicles. | |
| 5 | Arrival at meeting place. | | | Park vehicles in a safe area, off the road if possible and not causing an obstruction to other traffic. | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.02**
**Title: Refuelling Diesel Engines**
**Revision Date: 10th May. 2011**

**Prepared By: Safety Train & Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Revised By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Locate fuel source near engine. | Personal injury, or equipment damage, moving fuel source to fuelling point. | 16 Moderate | **Avoid reversing vehicles in close proximity to drill rig. Drive forwards when possible. Use a spotter for any vehicle movements on the drill site. Warn all personnel to keep clear.** | 2 Low |
| 2 | WARNING<br>**Shut down engine.** | Fire hazard. | 11 Moderate | Ensure equipment being refuelled is parked up in a safe, hazard free area. **No sources of fire ignition, such as hot exhausts or turbos.**<br>**If you have reason not to shut down the engine when refuelling, you must do a JSA. Do not proceed with refuelling until you are sure that you can safely do so.** | 1 Low |
| 3 | Clean around fuel cap. | Fuel contamination, | 17 Moderate | **Have correct fire fighting equipment available.**<br>**Do not smoke or allow others to smoke.** | 5 Low |
| 4 | Remove fuel cap | Fuel contamination, | 17 Moderate | Release pressure from cap.<br>Use a clean cloth.<br>Do not use hessian to clean areas.<br>Do not use twigs or pieces of wood to dip tank. | 8 Moderate |
| 5 | Place clean fuel nozzle in tank | Fuel contamination, | 17 Moderate | Ensure nozzle is clean<br>Use a clean cloth.<br>Do not use hessian to clean areas<br>Do not use twigs or pieces of wood to dip tank. | 4 Low |
| 6 | Slowly fill up avoiding overfilling and spillage. | Fire Hazard | 20 High | Have correct fire fighting equipment available.<br>Do not smoke or allow others to smoke.<br>Make sure mobile phones are turned off.<br>Avoid spillage place absorption matting on ground to capture spillage if it occurs.<br>Follow environmental procedures if spillage occurs. | 4 Low |
| 7 | Remove nozzle/funnel. | Drips, Spills | 7 Moderate | Catch drips in rag/drip tray, wipe funnel. | Low |
| 8 | Replace fuel cap | Fuel Contamination | 8 Moderate | Ensure fuel cap is securely fitted<br>Ensure cap is free of any impurities | 4 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.03**
**Title: Hiab Operation**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Conduct a risk assessment of the area prior to positioning hiab vehicle. Identify and control possible hazards e.g. overhead power lines, overhanging trees, sort/boggy ground, hazardous storage areas etc. | | | ▪ Perform Pre starts on truck etc | Low |
| 2 | Park the vehicle on as level a surface as possible, facing away from rig (if applicable) and engage the park brake. **Note: Ensure wheel chocks are in place to prevent vehicle from moving.** | ▪ Vehicle movement<br>▪ Crush injury | High 23 | (NOTE: Be aware of location on controls when positioning truck.)<br>Be aware of vehicles moving! | Low 5 |
| 3 | Ensure PTO is in gear. | | | | Low |
| 4 | Extend outriggers fully out and rotate jacklegs down and lock in. | ▪ Manual Handling | Moderate 14 | **Caution:** Ensure care is taken in rotating jacklegs, as they can be quite heavy | Low 4 |
| 5 | Lower jacklegs | ▪ Pinch points<br>▪ Crush injury | Moderate 14 | Use a spotter to ensure area is clean | Low 4 |
| 6 | Check that stabilising jacks are not sinking into the ground surface — if this happens the vehicle may tip over. If jacks l show evidence of sinking, use stabiliser plates or timber to spread the load and ` increase the supporting area, - | ▪ Crush injury<br>▪ Vehicle tip Over | High 24 | Correct packing under jack legs to be used at all times | Low 6 |
| 7 | Know the maximum lifting capacity (SWL — safe working load) of the crane and do not attempt to lift loads exceeding this | ▪ Tip over<br>▪ Falling objects<br>▪ Lifting gear failure | High 23 | Ensure person operating Hiab is passed out competent and has operation ticket | Low 6 |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.03**
**Title: Hiab Operation**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 8 | Carry out a function test without load before operating the crane loaded — extend the boom fully and ensure that all overload protection is working. Check the manufacturers Operator Manual and WLL chart for specific details on overload protection and function tests for the particular crane. | ▪ Contact with personnel while testing<br>▪ Vehicle tip over due to overloading | High 24 | Alert personnel as to movement of boom etc<br>If overload protection does not work, cease operation of the crane and tag "out-of-service" until rectified. | Low 6 |
| 9 | Check that lifting chains, swivels, hooks etc are in good working order- inspection tag and SWL should be attached to all lifting gear. | ▪ Lifting gear failure<br>▪ Falling objects<br>▪ Personal injury | Moderate 15 | Do not stand under suspended load | Low 4 |
| 10 | Crane must be operated by only one operator at a time ·- other personnel must be cleared from the operating danger – zone. This danger zone is the entire area over which the crane may be slewed. | ▪ Crush injury<br>▪ Falling objects<br>▪ Swimming loads | High 24 | Ensure all personal are out of Operation Danger Zone | Low 4 |
| 11 | A spotter shall be used at all times. Any person involved in giving lift directions to the operator must remain outside the danger zone and use approved/agreed hand signals. | ▪ Incorrect hand signals<br>▪ Machinery Damage<br>▪ Personal injury | High 24 | Ensure correct signals are used | Low 6 |
| 12 | The operator must remain in contact with the controls at all times while the lift is in progress — do not leave the controls while any load is suspended. | ▪ Crush injury<br>▪ Suspended loads | High 23 | If during the course of a lift the crane driver must leave the controls, the load should be placed on the ground and the crane shut down in the prescribed manner. | Low 6 |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.03**
**Title: Hiab Operation**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 13 | **Extreme Hazard:** Move the crane/load away from the operator, always ensure that the load being lifted or the body of the crane is not being lifted over the top of him/her and use the controls on the opposite side to the lift. | ▪ Crush injury<br>▪ Death ‘ | High 24 | No personal to be in danger zone under suspended load, while operator can not see spotter | Low 6 |
| 14 | Move the crane/load over the back of the vehicle only — never move the crane/load over the top of the vehicle cab, exhaust pipes, air intake etc. | ▪ Equipment damage | Moderate 16 | Move load over back of vehicle only | Low 4 |
| 15 | Keep the load as close to the crane as possible and do not slew and lift at the same time. | ▪ Uncontrolled Movement<br>▪ Personal Injury<br>▪ Machine Damage | Moderate 14 | Follow set correct | Low 3 |
| 16 | Do not drag or snag the load. | ▪ Equipment damage<br>▪ Slings damage | Moderate 14 | Check slings before and after<br>Use Tag Out if damaged | Low 3 |
| 17 | Never use the crane to lift or lower personnel. | ▪ Fall from heights<br>▪ Personal injury | High 24 | Crane is not made for moving people (DO NOT ATTEMPT THIS) | Low 3 |
| 18 | **Extreme Hazard** Do not allow any person to stand or pass under any load. | ▪ Crush injury<br>▪ Death | High 25 | Do not stand or pass under suspended load | Low 6 |
| 19 | Ensure the load is fully stable and stationery on the ground or other surface before attempting to undo lifting slings, hooks, etc. | ▪ Pinch points<br>▪ Crush injuries | Moderate 16 | Stable area to be identified before moving Load<br>Before unhooking insure load is stable | Low 5 |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.03**
**Title: Hiab Operation**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| | | ▪ | | | |
| 20 | When lift is completed stow the boom in its folded position on the vehicle and secure, using controls on the opposite side to final boom position. Vehicle is not to be driven unless crane is secured in this manner. | ▪ Crush injuries<br>▪ Equipment damage | Moderate<br>10 | Beware of pinch points and moving jib | Low<br>3 |
| 21 | Retract the stabilising lacks. | ▪ Refer Step 4 | | | |
| 22 | Disengage PTO before moving vehicle. | | | | |
| | ***Adjustments or repairs made to cranes must first receive approval from Australian Mineral & Waterwell Drilling and comply with manufacturer specifications.***<br>***Where necessary ensure any permits required are obtained and in place before any lift commences.*** | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURHSE 2.05**
**Title: Site Move**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Transport all equipment and plant to site | Personal injury vehicle accident<br>Damage to property | 20<br>High | All drivers to hold appropriate on site permits.<br>Vehicles to have mine safety equipment. ie: Rotating beacon, Mine radio, safety flag , and fire extinguishers. | 2<br>Low |
| 2 | Arrive on site Meet with client representative fellow directions to drill site | Miss communication effecting contract — i financial loss.<br>Personal injury placing crew in danger | 20<br>High | Attend client/site induction<br>Ensure the drill site has been prepared for site preparation and is adequate.<br>Inform mine, site, or pit control as appropriate before moving.<br>Obey all traffic control signs and procedures. | 2<br>Low |
| 3 | Organize crew and plan site lay out | Incorrect information | 18<br>Moderate | Induct client to drill rig<br>Place appropriate warning signs and lights.<br>Ensure crew is full aware of program and site requirements | 5<br>Low |
| 4 | Unload plant and equipment | Personal injury Sprains and Strains | 17<br>Moderate | Follow SWP's:<br>SURHSE 1,02 Manual handling<br>SURGEN 2.04 Secure Loads<br>SURGEN 2.03 Hiab operations | 4<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.06**
**Title: Setup of Surface Rig**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Check drill site has been prepared | | | SWP SURGEN 2.05 | |
| 2 | WARNING<br>**Check for overhead power lines, overhanging trees, possible underground cables** | Personal injury - falling objects - electric shock | 24<br>High | Remove overhanging branches or move rig if permitted<br>Obtain permits regarding overhead cables and underground cables/pipes<br>**Notify supervisor or client if not satisfied with site layout** | 4<br>Low |
| 3 | Make sure sight pegs are in and hole peg shows dip and azimuth | Lining rig incorrectly | 15<br>Moderate | Obtain correct hole information from client | |
| 4 | Drive rig onto site in line with sight pegs | | | | |
| 5 | Shut down truck | | | | |
| 6 | Do pre-start check on rig | | | | |
| 7 | Start rig | | | | |
| 8 | Put bed logs under jack legs | Personal injury — rig tips | 16<br>Moderate | Use bed logs to level rig and add ground stability.<br>It may be necessary to pig sty bed logs in soft formations<br>SWF SURHSE 1.02 Manual Handling<br>PPE: gloves and eye protection. | 4<br>Low |
| 9 | Lower jack legs end level rig, side to side, front to beck | | | | |
| 10 | WARNING<br>Raise mast to required angle and dump. | Personal injury | 23<br>high | Check for overhead obstacles.<br>Ensure mast wedges are correctly located and fitted.<br>SWF SURGEN Raising/Lowering mast 2.07 to 2.12 | 7<br>Low |

# STANDARD WORK PROCEDURE

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 11 | Pin mast stay rod (where fitted) | | | | |
| 12 | Check mast angle and rig is level Lower decks and level | Personal injury | 23 High | SWP SURHSE 1.02 Manual Handling<br>P.P.E. gloves and eye protection.<br>Pre-Start inspections on lifting gear. | 7 Low |
| 13 | Dig protecting bund wall in front of bed logs and around collar, to drain water away from rig | Rig slipping or falling from hole | 23 High | SWP SURHSE 1.02 Manual Handling<br>**Ensure a sufficient drain is in place to drain water away from rig.**<br>**Monitor rig stability throughout drilling process** | 7 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.13**
**Title: Main Winch Operation**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Once the engine throttle is set<br>**For UDR 650**: Engage the main pump lever fully and open the Boom Vert tap fully for extra pull, position boom out the way of head as pressure will be released from boom and ram will close up.<br>**For UDR 1000**: Once the "Lateral Boom Lock/Winch Pull" selector position chosen, the main winch operation becomes a one—lever function.<br>**For UDR 1000 MKII** onwards and **UDR1200**: No other function needs to be adjusted.<br>The further the main winch lever is moved the faster the winch lifts or lowers | Personal injury – Equipment damage | 16<br>Moderate | Never stop engine whilst the rods are still freely suspended from the main winch<br>**Refer to Operators Manual for specific rig operation** | |
| 2 | For most hoisting operations other than rod handling (with winch rope reeved through boom snatch-block) it is best to run the engine at 2200 rpm, control the speed with the winch lever, then before stopping, slow the winch down by easing off the main winch lever rather than letting it snap home | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.14**
**Title: Wire Line Winch Operation**
**Revision Date: 8th Oct. 2010**

**Prepared By Vaughan Cullen**
**Approved By: Training Assessor**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Engine throttle to be set on idle | | | | |
| 2 | The wire line winch operation is a one lever operation | Personal injury – Uncontrolled movement | 21 High | Move lever in a gradual and controlled movement. | 7 Moderate |
| 3 | To commence operations remove the secondary locking device, the primary locking device can be lifted to enable wire line winch operations | | | | |
| 4 | The further the wire line winch lever is moved the faster the winch will lift or lower | Personal injury – uncontrolled movement | 22 High | Move lever in a gradual and controlled movement. | 7 Moderate |
| 5 | Wireline lever is not to be locked in place whilst lifting and lowering operations are in progress by either manufactured locks or temporary locks, (ie; screwdriver, etc) Wireline lever to be manned at all times during operations | Personal injury – Equipment falling | 22 High | Always man wireline lever whilst in operation | 7 Moderate |
| 6 | Before commencing wire line operation to pull core tube, set wire line torque limiter to desired setting | | | | |
| 7 | On completion of the wire line operation store specific tool eg: overshot, at the side of the mast in a safe and secure area | Personal injury – Equipment damage activate wire line winch | 20 High | Ensure all items are correctly stored and SECURED when not in use | 4 Low |
| 8 | Set lever into neutral position, lower primary locking device and install secondary locking device. Check lever is locked in the neutral position | Personal injury – Equipment damage activate wire line winch | 20 High | Ensure locking devices are operational | 4 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.17**
**Title: Mixing Mud**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| | **When using Hopper and Mixing Pump** | | | | |
| 1 | Fill mixing tank with fresh make up water. | Tripping over hoses Personal injury. | 12 Moderate | Ensure safe working area<br>SWP SURHSE 1.03 Housekeeping<br>ie: Steps to mud tank, level ground.<br>Train employees to this instruction. | 4 Low |
| 2 | Make sure suction and delivery hoses are not blocked | | | | |
| 3 | Check hopper and venturi is clean and not clogged with unmixed materials | Poor mixing. | 7 Moderate | Keep hopper clean and dry. | 2 Low |
| 4 | Check oil and fuel on mixing pump motor and start pump<br>Mechanical or air agitator may also be used. | | | Take up compression on pull start before pulling on cord to reduce risk of strain. | |
| 5 | Lift one bag of gel and lay across hopper | Heavy lift<br>Personal injury | 18 Moderate | Read MSDS on individual chemical being used.<br>Apply SWP SURHSE1.14 Chemical Handling<br>SWP SURHSE1.02 Manual Handling.<br>With a scoop add the mud to the hopper. | 4 Low |
| 6 | Open bag with knife and slowly feed into hopper | Gel block up in hopper unable to continue mixing. Eye injury — dust of gel can enter your eyes. | 12 Moderate | Wear protective safety equipment for knife handling and as per MSDS.<br>Feed gel slowly into hopper to avoid gel fish eyeing. Keep hopper dry to avoid powder or granules sticking to side of the hopper | 4 Low |
| 7 | When bag is empty ensure hopper and venturi is clean | Unable to continue mixing. | 12 Moderate | Keep hopper clean and dry<br>Clean out hopper.<br>Mix the gel slower through the funnel | 2 Low |
| 8 | If more gel is required for the mix continue as from Step 5 | | 12 Moderate | | |
| 9 | Allow gel mix for approximately 20 minutes | Poor mixing gel not yielding. | 12 Moderate | Mix mud in advance of when it is needed to allow adequate time for mud to mix | 2 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.17**
**Title: Mixing Mud**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 10 | Should trol be added to the mix, open trol bag only slightly and just sprinkle into hopper. | | | Mix Trol or Pacs with Auscut or a Bit Lube for easier dispersion. | |
| 11 | When liquid polymer be added, pour the polymer from the container into a small can first, Then very slowly pour the required amount of polymer into the hopper, aiming for the jet stream — from the venturi so the polymer will go direct into the jet flow and will not get glued up on the inside wall of the hopper. | Polymer glues up in hopper,<br>Waste of polymer.<br>Adding liquid too fast polymer not mixing properly | 12<br>Moderate | Pour direct into jet flow<br>Pour polymer very slowly<br>Use Foam if applicable to help mix mud. | 4<br>Low |
| 12 | Allow mix enough time to reach the required viscosity | Incomplete mixing. | 7<br>Moderate | | 2<br>Low |
| 13 | Using a marsh funnel, measuring cup and stop watch, check and record the viscosity of the mud mix. | Marsh funnel dirty, blocked up. Unable to read viscosity. | 4<br>Low | Clean funnel before use | 2<br>Low |
| 14 | Put empty gel and trol bags into waste bin and record the quantity you have used. | Empty bags left on grounds<br>Slipping on empty bags personal injury. | 11<br>Low | Dispose of bags as soon as possible.<br>Do not spill materials on ground dispose of properly.<br>Plastic containers may be recycled.<br>Read MSDS on Environmental recommendations. | 2<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.18**
**Title: Using a Marsh Funnel**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Clean marsh funnel and measuring cup in clean water | Dirty tunnel. Funnel outlet gets partially blocked.<br>Untrue viscosity reading | 16<br>Moderate | Make sure funnel is absolutely clean | |
| 2 | Check outlet of tunnel is not blocked with any substance | | | | |
| 3 | Calibrate marsh funnel | Incorrect reading | 10<br>Moderate | One litre of fresh water should take 26 seconds to run through the funnel<br>Salt water will take longer. | 2<br>Low |
| 4 | Hold mash funnel in un upright position with one finger over the out let. | | | | |
| 5 | Fill funnel to just below the screen with make- up water | Incorrect mixture leading to malfunction | 8<br>Moderate | Allow 1 litre of make- up water to run back into the empty jug.<br>1 litre is clearly marked on the inside of the jug | 2<br>Low |
| 6 | Make sure the mix has fully developed. | | 8<br>Moderate | Pour sample through screen. | 2<br>Low |
| 7 | Pour the test sample freshly taken from the mud system through the screen in the top of the funnel. The level of the test sample should be just below the screen | Lumps in sample.<br>Incorrect volume | 8<br>Moderate | Pour sample through the screen. Fill to just below the screen. | 2<br>Low |
| 8 | Place empty cup on a level surface | | | | |
| 9 | Hold funnel over the jug have stop watch at the ready, start the test. | | 8<br>Moderate | Simultaneously remove finger from the out let of the jug and start timing | 2<br>Low |
| 10 | While the test sample is flowing back into the measuring jug, record the seconds it takes to fill the jug to the 1 litre mark | Incorrect viscosity reading. | 8<br>Moderate | 1 litre is clearly marked on the inside of the jugs | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.18**
**Title: Using a Marsh Funnel**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 11 | Record time in seconds as funnel viscosity | Test sample is flowing already into cup while timing has not yet commenced.<br>Incorrect viscosity reading | 8<br>Moderate | Start timing the flow at the same moment as finger is taken off the outlet | 2<br>Low |
| 12 | Pour the test sample back into the mixing tank and wash funnel and measuring cup in clean water | | | | |
| 13 | Record the viscosity | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.19**
**Title: Stilson Use**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Check tool prior to use | Personal injury | | Ensure stilson is clean jaws are sharp right size for the job and visually inspect the spring is in good condition.<br>Wear gloves.<br>SWP SURGEN 2.21 Repair stilsons | |
| 2 | Always maintain gap between the back of the hook jaw and the drill rod between 3 - 5mm | Personal injury – tools slips | 12<br>Moderate | Have 3mm - 5mm gap between hook jaw & drill rod. | 2<br>Low |
| 3 | When using stilsons on drill rods grip minimum 200mm above the thread as all drill rods have hardened ends. | Personal injury – tools slips | 12<br>Moderate | Grip rods at waist height and minimum 200mm above join.<br>Ensure stilson grips | 2<br>Low |
| 4 | WARNING<br>**ENSURE GOOD BALANCE**<br>When making or breaking rods which are in an upright position, place one foot in front of the other to transfer the body weight to the front foot before pushing or pulling. | Personal injury – tools slips | 12<br>Moderate | Spread feet for balance.<br>Maintain good Housekeeping policies<br>SWP SURHSE 1.03 Housekeeping Work Area.<br>SWP SURHSE 1.02 Manual Handling | 2<br>Low |
| 5 | Place stilsons on rod so that they "bite" onto rod. As join is broken with the upper body transfer the body weight from the front foot to the back without lifting feet off the ground. | Personal injury – tools slips | 12<br>Moderate | Maintain balance and ensure good grip on rod<br>Use larger stilsons to help break join. | 2<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.19**
**Title: Stilson Use**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 6 | Once join is broken pushing or pulling with stilson, start off with one hand on back of hook and one hand on the handle. | Personal injury – tools slips | 12<br>Moderate | Use smaller stilsons once join is broken and thread loose<br>Use one hand on back of hook to make sure it grips.<br>Push on stilson to unscrew<br>Pull on stilson to do up | 2<br>Low |
| 7 | Clean hook and heel with wire brush regularly | Personal injury – tools slips | 7<br>Moderate | Clean jaws and heels with wire brush. | |
| 8 | If hook and heel are clean and still slip, then they must be replaced.<br>Check for wear in stilson body. | | | Check spring if hook and heel in serviceable condition replace spring<br>SWP SURGEN 2.21 Repair Stilsons | |
| 9 | After each shift wash stilsons. | Personal injury – trip hazards | 7<br>Moderate | Ensure good housekeeping<br>Train to this standard<br>Gloves<br>SWP SURHSE 1.14 Chemical Handling<br>SWP SUQHSE 1.04 Housekeeping Tools | 2<br>Low |
| 10 | After use always return stilsons to rack. | Personal injury – trip hazards | 7<br>Moderate | Ensure good housekeeping<br>Train to this standard<br>SWP SURHSE 1.03 Housekeeping \Work Area.<br>SWP SURHSE 1.02 Manual Handling | 2<br>Low |
| 11 | BREAKING/TIGHTENING DRILLING TOOLS.<br>This practice can be conducted on trestles/racks setup for the purpose.<br>IF SAFE TO DO SO. | Slips<br>Personal injury | 20<br>High | SWP SURHSE1.02 Manual Handling<br>Gloves<br>Stabilize racks and trestles<br>WARNING<br>**Never stand on stilsons.**<br>**Ensure good balance** | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURGEN2.19**
**Title: Stilson Use**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 12 | WARNING<br>If the tool can not be tightened or broken safely on the racks then it must be placed on the ground and broken out or tightened. | Slips<br>Personal injury | 20<br>High | Ensure stilson is clean jaws are sharp right size for the job and visually inspect the spring is in good condition.<br>Wear gloves.<br>Have 3mm -5mm gap between hook jaw & drill rod.<br>Use smaller stilsons once join is broken and thread loose<br>Use one hand on back of hook to make sure it grips.<br>WARNING<br>NEVER STAND ON STILSONS OR BE SUPPORTED WHILST CONDUCTING THIS PRACTICE. | 6<br>Low |

**NOTE: BREAKING RODS & BITS ON ROD SLOOP OR UP ON THE BACK OF TRUCKS IS A HAZARD AND WILL NOT BE CONDONED OR TOLERATED**

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.20**
**Title: Using Breakout Stilsons**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Extend stilson ram | Personal injury — hands | 24<br>High | Do not place hands on stilsons when ram extending or retracting<br>Ensure Ram cover is in place and correct signage<br>Use handle on stilson to position | 7<br>Moderate |
| 2 | Place hook on rod and adjust to a gap of 3-5 mm | Handle broken off stilson | 18<br>Moderate | **Must ensure handle is attached to stilson at all times and guarding is in place.**<br>Gloves and eye protection. | |
| 3 | WARNING<br>Drill assistant must stand clear while driller retracts ram to break thread<br>Driller to engage ram slowly | Personal injury — hands<br>— legs | 24<br>High | Do not rest hands on stilson when making or breaking rods.<br>Stand clear in case stilson slips and swings out<br>Communication | 8<br>Moderate |
| 4 | Remove stilson and swing out of way<br>Driller retracts ram | | | | |
| 5 | WARNING<br>Inspect Breakout stilson for wear and cracking<br>Inspect hydraulic hoses for wear | Breakout components break<br>Hose blows | 22<br>High | Pre-start inspections<br>Regularly clean equipment<br>SWP SURGEN 2.21 Repair Stilsons<br>Inspect hoses for wear indications; Bubbling of hose and Rubber wearing away etc,<br>SWP SURAIR 3.17 Preventative Hose Maintenance<br>SWP MAINGEN 9.17 Preventative Maintenance Hydraulic Hose | 10<br>Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.21**
**Title: Repair Stilsons**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Unscrew adjusting nut so hook comes off Stilson. | Spring may come out when pulling hook from Stilson — Eye Injury. | 24 High | Wear protective glasses and gloves. | |
| 2 | Grind or file pin on heel flat. | Hand and Eye Injury. | 23 High | PPE: Safety mask and goggles or glasses, gloves and hearing protection.<br>Competent in the use of a grinder | 4 Low |
| 3 | Using around punch and a hammer hit pin until it comes out of Stilson. | Hammer missing punch.<br>Hand injury. | 16 Moderate | PPE<br>Use work bench and corrective tool for the job. | 4 Low |
| 4 | Slide in new heel. | | | | |
| 5 | Push new pin through Stilson and heel. | | | | |
| 6 | Burr over pin with hammer on both sides. | Steel splinter in Eye. | 23 High | PPE<br>Use the vice | 4 Low |
| 7 | Remove old flat spring and compression spring from Stilson. | Personal injury. | 11 Moderate | PPE | 4 Low |
| 8 | Fit new compression spring in hole inside Stilson. | | | Follow instructions on packet | |
| 9 | Put hacksaw blade over spring | | | | |
| 10 | Slide flat spring over hacksaw blade into inside of Stilson. Make sure flat spring fits inside the groove. | | | | |
| 11 | Pull hacksaw blade out and check if flat spring is sitting in proper place. | | | | |
| 12 | Fit new hook and adjusting nut | | 11 moderate | Wear gloves as new jaws have sharp edges. | 4 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.22**
**Title: Setting Up/Pull Down Lighting Plants**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Set up lighting plant | Rolling from parked position | 17<br>Moderate | —Require flat even area<br>—Chock wheels<br>—Set up and extend legs support<br>—Apply hand brake if applicable<br>Check fire extinguisher and lighting plant have in date tags | 4<br>Low |
| 2 | Lay down Environment cover | | | | |
| 3 | Unfold and raise lighting mast | Personal injury Pinch points | 17<br>Moderate | Unhook safety clamps<br>Ensure swivel base is locked in place<br>Ensure balanced and raise mast until locks in place | 5<br>Low |
| 4 | Positioning mast | Mast not staying in place and lying back down | | Ensure all pins are in their rightful place | |
| 5 | Raise Mast | Rope catching/breaking<br>Handle breaking<br>Winch jamming | 17<br>Moderate | Visually inspect handle condition<br>Watch rope as it winds up<br>Watch and inspect winch ceiling<br>Pre—start and inspection sheets | |
| 6 | WARNING<br><br>NEVER RUN LIGHT WITHOUT LENSE FITTED.<br><br>Start lighting plan | Engine failure<br>Electrical damage or shock<br>Eye soreness | 12<br>Moderate | Pre-start check<br>Test earth leakage<br>Ensure any lighting plant and leads or electrical devices that may be plugged into lighting plant MUST have a current electrical inspection tag on<br><br>Ensure glass lenses are fitted to all lights | 2<br>Low |
| 7 | Pull down lighting plant in reverse order. | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.23**
**Title: Set down Lay Area**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| 1 | Transport all equipment and plant to site | Personal injury vehicle accident<br>Damage to property | 20<br>High | All drivers to hold appropriate on site permits.<br>Vehicles to have mine safety equipment. ie: Rotating beacon, Mine radio, safety flag, and fire extinguishers. | 2<br>Low |
| 2 | Arrive on site. Meet with client representative follow directions to laydown area | Miss communication effecting contract-financial loss.<br>Personal injury placing crew in danger | 20<br>High | Attend client/site induction<br>**Ensure the laydown area has been prepared, is of adequate size, has a fire break and not situated in a low lying area.**<br>If on a mine site inform the appropriate authorities before moving. Obey all traffic control signs and procedures | 2<br>Low |
| 3 | Organize crew and plan out laydown area | Incorrect information | 18<br>Moderate | WARNING<br>**Place appropriate warning signs and lights.**<br>**Ensure crew is fully aware of the laydown setup.**<br>**Ensure all oils and oil containing products are positioned on a plastic oil bung.**<br>**Ensure all hazardous chemicals are labelled and the storage directions according to MSDS are in place**<br>**Ensure all perishable items are covered with a tarp.**<br>**Ensure fire extinguishers are located near combustible materials**<br>**Ensure signage is in place for these products**<br>**Ensure all personnel are inducted on the emergency procedures** | 5<br>Low |
| 4 | Unload plant and equipment. | Personal injury Sprains and Strains | 17<br>Moderate | Follow SWPS<br>SURHSE 1.02 Manual Handling<br>SURHSE 1.14 Chemical handling<br>SURHSE 1.03 Housekeeping Work<br>SURGEN 2.03 Hiab Operation<br>Gloves. | 4<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.24**
**Title: Install BOP**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Preparing to install BOP | Personal injury manual handling Lifting | 8 Moderate | Erect barricade around the drill site. Ensure that all warning / safety signs are clearly visible. (ie: no entry unless authorised no naked flames within 80m of the drilling rig. Excavate a pit at collar point to be used as the BOP cellar. | |
| 2 | Set up the rig over the BOP cellar. | Personal injury manual handling Lifting | 12 Moderate | Follow rig set up procedures. | 5 Low |
| 3 | Set up ancillary equipment. | Personal injury manual handling Lifting | 12 Moderate | Follow rig set up procedures. | 5 Low |
| 4 | Start drilling. | Personal injury Rotating Equipment | 13 Moderate | All personal shall stay well clear of rotating equipment. Close spin guard. Drill a hole to suit the size of the surface casing. | 6 Low |
| 5 | Install the surface casing. Set up a diverter on the surface casing. | Personal injury. Mixing and circulating cement. | 8 Moderate | Cement surface casing in, making sure the annulus of the hole is filled to the bottom of the BOF cellar. | 3 Low |
| 6 | Drill pre cellar. Drill the pre—collar to a depth of not less than 10% of total hole depth. | | | | |
| 7 | Pull the rods WWI MANH 9.012 The hole must be kept full of water / drilling fluid at all times. | | | | |
| 8 | Install the casing. WWI DlAM 2.011 Cement the casing in. Ensure the annulus of the hole is filled to the bottom of the BOP cellar. Wait for the cement to set. | | | | |
| 9 | Install the BOP / STACK. | Personal injury. Manual handling | 8 Moderate | Fit a flange to the top of the casing to suit the flange on the bottom of the BOF. | |
| 10 | Fit steel sealing ring | | | Make sure the steel ring (seal) is fitted correctly between the flange on the casing & the flange on the BOP. Bolt on the BOP / STACK. | |
| 11 | Set up flare line. | Personal injury. Manual handling. Hand tools | 8 Moderate | Install 12 metres (minimum) of flare pipe, fitted with a pressure gauge (minimum 1000 psi ) & a ball valve. | 3 Low |

# STANDARD WORK PROCEDURE

**No: SURGEN2.24**
**Title: Install BOP**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | | | | (minimum 2000 psi) to the BOP, making sure both the gauge & the ball valve are easily accessible. Flare line between<br>BOP St ball valve must not have any bends in the pipe. The end of the flare pipe must go to a pit & be secured. | |
| 12 | Fit kill line. | Personal injury, Manual handling. Hand tools. | 8<br>Moderate | Install a kill line with a ball valve fitted (minimum 2000 psi) between the kill pump & the BOP. Make sure the ball valve is easily accessible. | 3<br>Low |
| 13 | Connect kill line to mud tank. | Personal injury, Manual handling. Hand tools. | 8<br>Moderate | Fill the mud tank with water & mix a brew of mud. The mud tank shall be kept full at all times. | 3<br>Low |
| 14 | Prepare to test BOP & casing | Personal injury, Equipment damage | 8<br>Moderate | Run a length of drill pipe through the BOP to start pressure | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.25**
**Title: Test BOP**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Testing BOP. | Personal injury. | 16 Moderate | Brief all personal on testing procedure.<br>Make sure that the ball valves on the flare line & the kill line are closed.<br>Driller to ensure crews understanding of procedure | |
| 2 | Close BOP. | Equipment damage | 8 Moderate | **Never close BOP without a drill rod or pipe through the BOP.** | 3 Low |
| 3 | Pressurise hole. | Personal injury. | 13 Moderate | All pressure lines shall be secured. Pressurise hole through drill pipe. Only pressurise hole to 50% of rated working pressure of BOP. If BOP is rated to 2000 psi only pressurise hole to 1000 psi. | 6 Low |
| 4 | Hold pressure. | Personal injury. | 13 Moderate | Shut off the pump. The BOP should hold 95% other pressure for a period of 15 minutes, (ie; 95% of 1000 psi is 950 psi) If BOP does not hold this pressure it means the BOP is in need of repairs. | 6 Low |
| 5 | Release pressure. | Personal injury. | 13 Moderate | After the test is completed open the BOP slowly to release the pressure. | 6 Low |
| 6 | Lower drill string in to hole Refer WWI DIAM 2.012 | | | Run drill string down the hole, stopping just above the cement plug. | |
| 7 | Drill out cement plug. | Equipment damage | 8 Moderate | Flush rods to top of cement plug &drill out cement plug. Drill on into the rock for another 1 to 3 metres. Pull rod string back to the bottom of the casing. Secure rods in foot clamps then close the BOP. | |
| 8 | Pressure test casing and ground. | Personal injury. Pressurised equipment | 8 Moderate | All pressure line shall be secured. Start the pumps and slowly pressurise the hole through the drill string. | 3 Low |
| 9 | Reed "shut in casing pressure". | Personal injury. Pressurised equipment | 8 Moderate | All pressure line shall be secured. Continue pumping until the pressure stops increasing. This pressure reading now becomes the maximum shut in pressure (SICP) | 3 Low |
| 10 | Release pressure. | Personal injury. Pressurised equipment | 8 Moderate | Open BOP slowly to release the pressure | 3 Low |
| 11 | Drill on<br>Lower drill pipe peck to bottom and continue drilling | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.26**
**Title: Calculate & Record Hole Depth**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Introduction | | | Accurate measuring and recording of the depth of the hole is critical to the drilling operation. The measurements and number of all down hole equipment must be recorded prior to been lowered into the drill hole. | |
| 2 | Collaring a new hole | | | Lower B.H.A. (Bottom hole assembly) IE Hammer, core barrel, roller bit, pcd bit subs, starter rod ECT Through the rod holder until the bit is touching the ground at the start of the new hole collar. Secure B.H.A. in the foot clamps. Measure the distance from the ground at the new collar, along the B.H.A. to the top of the foot clamps. Under ground rigs, measure to the back of the rotation unit. This is known as the **"Constant stick up"** | |
| 3 | Calculate and record **"working B.H.A. length"** | | | Subtract the constant stick up from the total length of the B.H.A. This measurement is known as the **"Working B.H.A.". Record all measurement in the run sheet book."** | |
| 4 | Calculate length of drill string | | | The working length of the B.H.A. plus the total length of the rods in the hole and connected to the heed or, under ground, the water swivel is known as the **"drill string"** | |
| 5 | Calculate depth of hole | | | While the bit is on the bottom of the hole, measure from the top of the foot clamps to the top of the rod sticking up the mast. Under ground, with the rotation unit full forward measure from the back of the rotation unit to the water swivel sub and kelly rod join. Subtract this measurement from the **drill string**.<br>This is the depth of the hole. | |

# STANDARD WORK PROCEDURE

**No: SURGEN2.26**
**Title: Calculate & Record Hole Depth**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | | | | Example (BHA = Bottom Hole Assembly)<br><br>Total length of BHA = 4.2m<br>Minus Constant stick up .8m<br><br>Equals Working BHA length= 3.4m<br><br>Plus Drill string (35x6) = 210m<br>Plus (1x3)= 3m<br><br>Total drill string length = 216.4m<br>Stick up = 2.5m<br>Hole depth = 213.9m | |
| 6 | Record in the run sheet book | | | | |
| 7 | **Note 1** | | | Underground rigs may count rods in 3m and 1.5 lengths. Surface rigs may count rods in 3, 5, 9 or 12m lengths. | |
| 8 | **Note 2** | | | This procedure may vary depending on the rig, rods and the job requirements. Whichever system is used the result shall be. Accurate measurement and recording of the hole depth A format that is agreed upon and allows easy checking by cross shift, supervisor and client. | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.27**
**Title: Loading / Unloading Rod Spinner**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Prepare to mount rod spinner onto hinge points on mast ensuring drill rod box only 100mm above foot clamps. | Equipment damage | 7 Moderate | Don't have rod too low because it will squash rod box, and don't have rod too high because spinner won't swing into mast. | 4 Low |
| 2 | Ensure crew are aware of procedure before car in out the task. | Personal injury. Equipment Damage | | Operator must have good communication with crew while mounting spinner ensuring all are familiar with the task. | |
| 3 | Check all lifting gear is in good working order before connecting **eg. Lifting plate pins, shackles etc.** | Personal injury – Crush Injuries Equipment Damage | 13 Moderate | Check all lifting gear including winch rope, d-shackles are tight, and lifting plate plus pin are not worn. | 5 Low |
| 4 | Connect winch onto lifting plate eyelet. Take up weight on winch. | Personal injury | 8 Moderate | Be sure that lifting plate is mounted correctly under spinner will be centralized and will be easier to handle. | 2 Low |
| 5 | Lift rod spinner slowly into position also swinging boom into mast centre. | Personal injury | 8 Moderate | Ensure hydraulic hoses are not hooked on corner of jump up stand<br>Make sure crew members are not in front of suspended load and feet are clear at all times. | 3 Low |
| 6 | Swing rod spinner to line up hinging points and slowly lower onto pins. | Personal injury – Crush Injuries Equipment Damage | 13 Moderate | Be sure to use handles provided on spinner to line up hinge points to prevent personal injury.<br>Make sure spinner is sitting right down on hinge pins. | 2 Low |
| 7 | Lower winch and disconnect winch from lifting plate. | Personal injury. Equipment Damage | 2 Low | After disconnecting and before lifting winch to move out of way, ensure d-spackle is tight. Swing boom out of mast | 1 Low |
| 8 | On hinge points swing spinner in sitting rollers on runner rail.<br>Flick lock over behind rail | Personal injury | 8 Moderate | Check that locking lever is right over.<br>Gloves to be worn | 2 Low |
| 9 | Shut rig down if needing to hook up hydraulic hoses and release pressure | Personal injury (injection of oil into skin) | 13 Moderate | Ensure all pressure is released from hydraulics to prevent personal injury and blowing seals out of quick release fittings (if used) | 5 Low |
| 10 | Before pulling rods ensure spinner is centralized with drill rods in clamps | Equipment damage | 8 Moderate | If spinner not centralized check rig is level and make adjustments required | 2 Low |
| | ***Reverse the steps of above procedure for unloading of Rod Spinner*** | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.28**
**Title: Tramming Track Mounted Rig**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Prepare to move rig after rigging down. **(Engage tramming functions)** | Equipment Damage Personal injury. Trip hazards | | Insure all hoses (sample, suction, and pump out hoses) off ground and secure for rig movement. Bed logs and all other objects out of rig path. | |
| 2 | Moving rig from inside operators cab. (front of rig) | Personal injuries Crush. Equipment Damage | | Insure operator has side gate closed on cab and seatbelt is fastened. When moving rig drill crew and other members on site are 6 meters away from rig and are giving you guidance. | |
| 3 | Moving onto new site. **Note: only operate tramming from back when lining up onto collar point.** | Personal injury, Equipment Damage. (Most Damage) | | Look out for objects, (trees, banks, rock faces.) other vehicles, (when if), rig rotates on tracks. Be sure to have guide if drill site is tight. | |
| 4 | Lining up over hole collar point or existing collar. (Operating from rear controls) | Personal injury (Crush) | | Place drillers, platform is down and not going to get court or snagged on objects. Operate standing on platform and offsiders lining you up off azimuth line. | |
| 5 | Once lined up, level up rig. **(disengage tramming functions)** | Personal injury | | Place bed logs under jack legs being sure all crew, are in site and hands, feet free of logs. Jack up rig till level. Checking azimuth. (ok) | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.30**
**Title: Drill Sump Usage**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Site Identification | Incorrect Placement of sump Position | 13 | Client to advise and Check Sump Placement | 1 |
| 2 | Obtain Dig Permits if required | Interaction with services | 22 | 1. Complete Dig Permit if required<br>2. Client takes responsibility for sump excavation Mark out.<br>3. No Mark out No dig unless Client signoff and Authorisation | 5 |
| 3 | **Excavation of Sump Under AMWD Supervision (Clause in Contract)** | Interaction of untrained AMWD Personnel and Excavation Contractor | 13 | 10 meter stand oft zone between Machine and Major Drilling Personnel<br>WARNING<br>If Verbal communication Needs to take place between Machine operator and AMWD Personnel<br>• Operator MUST idle machine down, neutralise machine and exit Cab and communicate on ground.<br>• Dump spoil 2/12 meters clear of sump | 5 |
| 4 | **Fence Sumps** | Falling into Sumps | 13 | • install Ladder(s) into Sump for Emergency<br>• Keep 2 meters clear from edge of sump when erecting Fence<br>• Clear and Trip Hazards before starting fencing work | 5 |
| 5 | **Un—Fencing Sumps (Client responsibility for fencing Sump)** | Animal Personnel falling into Sumps | 13 | Do not fill with Water. Report to supervisor and or Client Representative | |
| 6 | **Lining Sumps** | Falling into Sumps | 13 | Retract Ladder BUT keep Ladder close for Emergency Use<br>• Cut (if required) Lining to suit and place in Sump.<br>• Weigh down liner with Excavation Material. | 5 |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.30**
**Title: Drill Sump Usage**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 7 | Filling Sump with Water and Mixing Drilling Fluids near edge of Sump<br>WARNING | Falling into sumps | 15 | Before Filling Ensure Fence is Erected Working Next to Sump Edge.<br>• Visual Pre—Start inspection is too carried out each shift before any work commences with in the fence Sump Area.<br>• Sump area MUST have sufficient Lighting to operate safely at Night with No Trip Hazards and No Shadows in Work Area.<br>• Ladder MUST be in place in main working area of sump before any work commences.<br>• Ladder Must Stay in place until all work ceases and Sump is closed or Sump is Filled in (Regeneration) l | 1 |
| 8 | WARNING<br>Driller and Offsider Must have a<br>• Clear Visual Path to sump where Offsider is working, (when normal drill operation is in progress).<br>• If Visual communication cannot be maintained between driller and offside work area at sump, remove any obstacles or driller must operate the machine from a different position whilst Offsider is within fenced Sump Area.<br>• Allowances and a Visual Check for Night Time Operation must be completed on commencement of first night shift. | | | | |
| 9 | WARNING Warning Signs are placed in this procedure to High Light where Hazards Could Be Life Threatening<br>WARNING Danger Signs indicate where a Hazard is Likely to be Life Threatening | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURGEN2.30**
**Title: Drill Sump Usage**
**Revision Date: 8th Oct. 2010**

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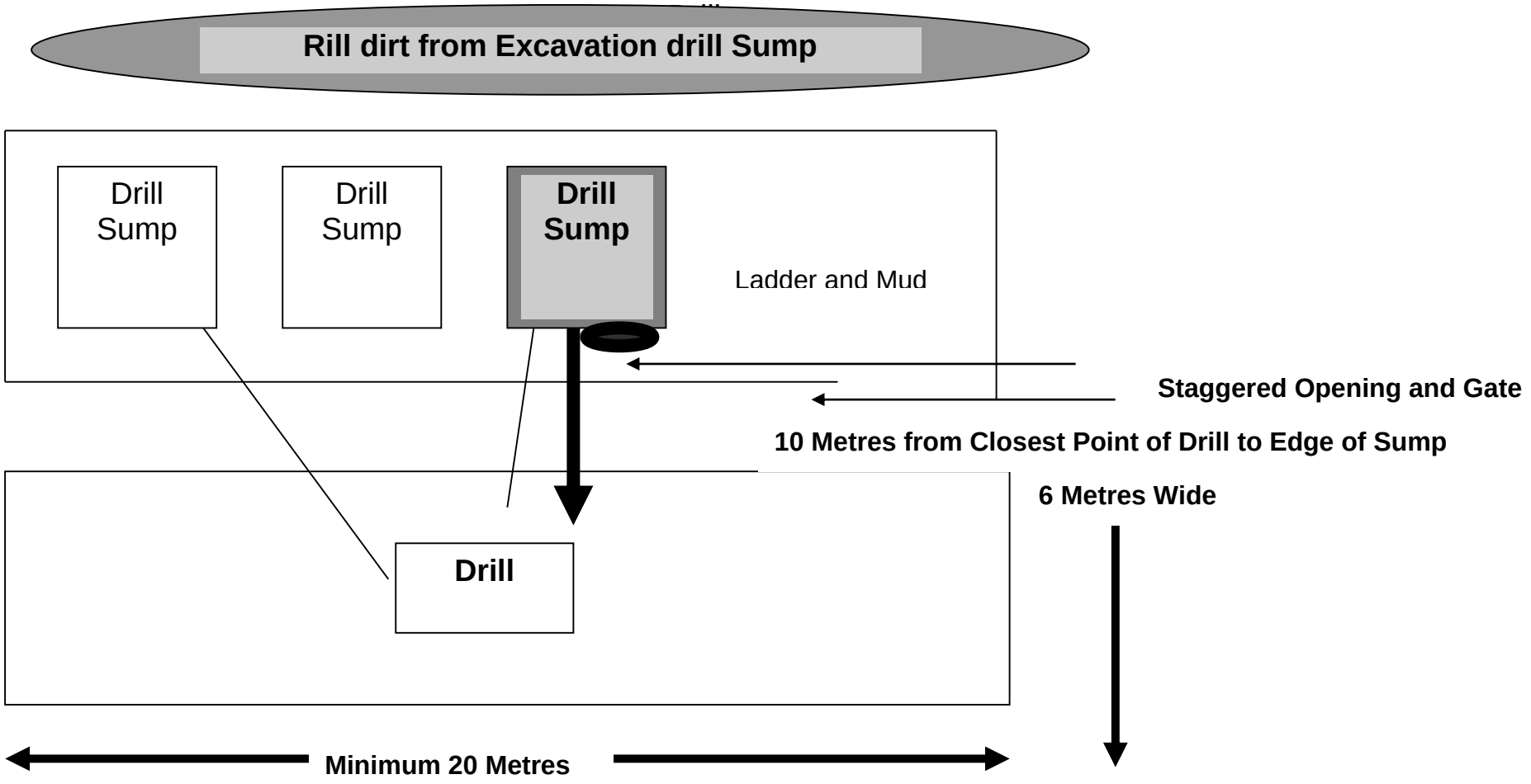
|---|---|---|---|---|---|

**Example of Sump Fencing**



AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.31**
**Title: Mud Pump Operations**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Pre-start inspection.<br>o Oil level<br>o Fuel filter condition<br>o Hose and clamp condition<br>o Rope and starting mechanism<br>o Frame condition<br>o Air filter clean<br>o Last service<br>o Decompression lever works<br>o Pump has compression | Equipment damage | 23<br>high | Ensure pump is secure<br>Oil level is not overfull as equipment damage can result<br>Oil level is not too low as equipment damage can result<br>If oil level is too low the pump will not start<br>Air filter is cleaned regularly<br>Rubber mounts are in good condition<br>Fuel system is clean<br>Ensure catch filter in top of the tank is cleaned regularly<br>Service every time the rig is serviced.250 hours<br>Try to avoid running the pump at full throttle for long periods | 8<br>moderate |
| 2 | Inspect the wet end and hoses<br>o Wet end of the pump is free from leaks<br>o The seals are free from leaks<br>o All hoses and clamps are secured and serviceable<br>o Foot valves are not blocked<br>o The loot valve or suction end of the pump is off the bottom of the sump<br>o The hoses have no leaks<br>o Check wet end is primed | Burn out the wet end seals<br>Personal Injury | 17<br>Moderate | WARNING<br>**Sumps can be deep and walls can collapse**, ask for assistance when working near the sump or its walls and ensure they are secure before walking on them.<br>Secure suction end off the bottom by use of a float or rod across the sump with the valve tied to it<br>Ensure that all string or rope cannot be sucked into the valve<br>Ensure the wet end is primed before starting<br>Follow correct manual handling procedure | 4<br>Low |
| 3 | Priming the pump | Wet end seals burn out | 18<br>moderate | Ensure the foot valve is not leaking and fill the hose with water, connect the hose and remove the filler cap on the pump wet end fill the wet end replace the cap but not tightly.<br>Once pump is started air will escape from the pump filler.<br>Close the filler cap securely once all air has escaped and water comes out of filler cap Working the hose and foot valve up and down can also help to prime the pump.<br>Repeat until pump primed but do not run without water in the wet end<br>Follow manual handling procedures | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

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|---|---|---|---|---|---|
| 4 | Start the pump<br>Turn the pump on (if applicable), activate compression lever down (if applicable), place one foot on the pump frame to steady it and the other behind you for balance, take up the free travel in the rope and feel the compression on the rope. With your arm and shoulder pull the rope in one sharp short pull. | Rope breaking<br>Back strain<br>Personal injury | 21<br>High | WARNING<br>**Ensure the compression lever is down**<br>**Ensure the free travel is taken up on the rope and you can feel the compression (resistance) on the rope prior to pulling the cord.**<br>**Ensure at all times that a foot is placed on the frame and the other behind you for balance.**<br>Follow correct manual handling and housekeeping procedures<br>Gloves | 7<br>Moderate |
| 5 | Stopping the pump<br>Loosen the throttle on the flexi drive pumps and push the stop button on the Robin pumps | Equipment damage | 21<br>High | **Never push the compression lever down on flexi drive pumps to stop them.**<br>Re-fuel as per SWP SURGEN 2.02 Refuel Engines.<br>Ensure correct fire extinguisher is available<br>Spill kit<br>Follow MSDS on chemical used to clean up and dispose of waste<br>Ensure a plastic waste bung is under the pump to catch any waste material | 7<br>Moderate |
| 6 | Moving the pump and hoses | Persona! injury | 21<br>High | WARNING<br>Ensure that two people lift the pump at all times.<br>Ensure two people remove the suction hose from the sump as hoses are very heavy when full of water.<br>Drain hose back into the sump before rolling up or moving | 7<br>Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.32**
**Title: Grinders – Bench and Hand Held**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Inspect tool and work area | Defected tool<br>Tagging not current | 24<br>High | WARNING<br><br>**Ensure tagging is current**<br>**Ensure tools is kept in a dry area**<br>**Ensure that you inspect for cuts on the cord**<br>**Ensure you check for fatigue**<br>**Ensure all guarding is in place and works**<br>**Ensure all bench grinders are securely mounted**<br>**Ensure all Stop/start buttons are within easy reach and work**<br>**Ensure all cutting equipment is sharp and the correctly rated and type of disc for the task**<br>**The disc hole is of the correct size and secure**<br>**Ensure clear access around the area**<br>**Ensure all fire equipment is tagged and serviceable**<br>**Ensure spotter and fire equipment are available**<br>**Ensure first aid kits are adequate in date and available**<br>**All ignition sources are removed**<br>**HOT WORK PERMIT for the task** | 7<br>Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

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**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
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|---|---|---|---|---|---|
| 2 | Plan the task:<br>Is the grinder of suitable size and construction for the job?<br>Do you have sufficient training to complete the task'?<br>Have you thoroughly inspected the tool, and work area?<br>WARNING<br>**Have you conducted a resonance test on the bench grinding wheel for defects by: Balancing the wheel on a finger in the mounting hold and give it a sideways tap with a screwdriver or small hammer. It should make a low but clear ring, if not, it may be cracked.** | Personal injury<br>Incompetencies | 22<br>High | Have the required training competencies required<br>Adequate PPE is available<br>Ensure tagging is current<br>Ensure tools are kept in a dry area<br>Ensure that you inspect for cuts on the cord<br>Ensure you check for fatigue<br>Ensure all guarding is in place and works<br>Ensure all bench grinders are securely mounted<br>Ensure all Stop/start buttons are within easy reach and work<br>Ensure all cutting equipment is sharp and the correctly rated and type of disc for the task<br>Ensure spotter and tire equipment are available<br>Ensure first aid kits are adequate in date and available<br>Ensure clear access around the area<br>All ignition sources are removed<br>HOT WORK PERMIT for the task | 7<br>Moderate |
| 3 | Start the bench grinder<br>WARNING<br>Never run a grinder with a defective wheel | Personal injury | 22<br>High | Ensure adequate PPE<br>Stand to one side of the grinder when turning on<br>Allow the grinder to reach its operating speed<br>Ensure stop switch is in easy reach | 7<br>Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

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|---|---|---|---|---|---|
| 4 | Position yourself in a comfortable stance in front of the grinder, bring the object in to contact with the grinding wheel slowly and smoothly avoiding impact or bumping motions.<br>Move the object back and forth across the face of the wheel as this prevents ruts and grooves forming in the wheel. | Personal injury | 22<br>High | Ensure adequate PPE. Face shield. gloves and dust mask<br>All guarding is in place<br>The mounts on the bench grinder are secure and in place<br>Use a clamping device to ensure hands are kept away from the wheel<br>Dressing the wheel is to be conducted by a trained person only | 7<br>Moderate |
| 5 | Dressing the wheel | Personal injury<br>Incompetencies | 22<br>High | WARNING<br>If a grinding wheel comes to the stage that it needs dressing the wheel if still useable shall be given to your supervisor for a trained person with the correct equipment to dress the wheel | 2<br>Low |
| 6 | Remove the object from the wheel and allow to cool | Personal injury | 16<br>Moderate | Place in an area away from ignition sources<br>Ensure spotter and tire equipment are available<br>Ensure first aid kits are adequate in date and available | 2<br>Low |
| 7 | Shut off the power and do not leave before wheel has stopped spinning | Personal injury | 16<br>Moderate | Ensure wheel has stopped spinning and the power source is disconnected and if applicable locked out. | 7<br>Moderate |

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|---|---|---|---|---|---|
| | | | | | |
| 8 | Hand held grinders<br>Air and electric<br>WARNING<br>HIGH PRESSURE AIR IS DANGEROUS AND CAN RESULT IN DEATH.<br>Use only for the task required | Personal injury | 22<br>High | Never direct compressed air towards any part of the body.<br>Check ratings on tools and air hoses<br>Conduct pre—start on plant / vehicle used for the air supply and ensure all safety requirements are adequate as per AMWD SWP's.<br>WARNING<br>Pre-start inspection<br>Ensure tagging is current<br>Ensure grinder and its components are dry<br>Ensure that you inspect for cuts on the cord<br>Ensure you check for fatigue<br>Ensure all guarding is in place and works<br>Ensure all Stop/start buttons are within easy reach and work<br>Ensure all cutting equipment is sharp and the correctly rated and type of disc for the task<br>Ensure the disc is free from detects<br>The disc hole is of the correct size and secure<br>Ensure the locking washer and nut are secured correctly<br>Ensure clear access around the area<br>Ensure all the equipment is tagged and serviceable<br>Ensure spotter and tire equipment are available<br>Ensure first aid kits are adequate in date and available<br>All ignition sources are removed<br>HOT WORK PERMIT for the task | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

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|---|---|---|---|---|---|
| | | | | | |
| 9 | Plan the task:<br>Is the grinder of suitable size and construction for the job?<br>Do you have sufficient training to complete the task?<br>Have you thoroughly inspected the tool, and work area? | Personal injury<br>Incompetencies | 22<br>High | Have the required training competencies required<br>Adequate PPE is available<br>Ensure tagging is current<br>Ensure tools is kept in a dry area<br>Ensure that you inspect for cuts on the cord<br>Ensure you check for fatigue<br>Ensure all guarding is in place and works<br>Ensure all Stop/start buttons are within easy reach and work<br>Ensure all cutting equipment is sharp and the correctly rated and type of disc for the task<br>Ensure spotter and tire equipment are available<br>Ensure first aid kits are adequate in date and available<br>Ensure clear access around the area<br>All ignition sources are removed<br>HOT WORK PERMIT for the task | 7<br>Moderate |
| 10 | Start the grinder<br>WARNING<br>Never run a grinder with a defected wheel | Personal injury | 22<br>High | Ensure adequate PPE<br>Stand to one side of the grinder when turning on<br>Allow the grinder to reach its operating speed<br>Ensure stop switch is in easy reach<br>Ensure all Air hoses are rated to the pressure out put<br>Ensure all air fittings are secure and no leaks | 7<br>Moderate |

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|---|---|---|---|---|---|
| | | | | | |
| 11 | Secure the object to be ground or cut.<br>Move the grinder to the object and then slowly and smoothly make the out or grind avoiding impact or bumping motions. | Personal injury | 22<br>High | **Ensure all guarding is in place and works**<br>**Ensure all Stop/start buttons are within easy reach and work**<br>**Ensure all cutting equipment is sharp and the correctly rated and type of disc for the task**<br>**Ensure the disc is free from defects**<br>**The disc hole is of the correct size and secure**<br>**Ensure clear access around the area**<br>**Ensure all the fire equipment is tagged and serviceable**<br>**Ensure spotter and fire equipment are available**<br>**Ensure first aid kits are adequate in date and available**<br>**All ignition sources are removed**<br>**HOT WORK PERMIT for the task**<br>**Adequate PPE. Face shield ,eye and ear protection, gloves and a dust mask**<br><br>Never twist the disc while cutting<br>Use the handle when cutting and grinding | |
| 12 | Follow steps six and seven<br>Then pack away all tools and equipment as per AMWD housekeeping policies | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.33**
**Title: Load/unload Rods manually From Vehicle**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Wear Correct P.P.E. | Personal injury<br>Hand injury | 25<br>High | Wear gloves to protect hands from sharp objects as well as mandatory PPE to protect other parts of the body (e.g. feet)<br>SWP UNDHSE 1.01 PPE | 8<br>Moderate |
| 2 | Ensure passage is clear between vehicles.<br>and rod stacks<br>Ensure rod stack is stable | Trip hazards<br>Rod stack falling or moving | 21<br>Significant | Remove any trip hazards.<br>Eg.: rocks, hoses, excess equipment.<br>Stabilise load with wedges to prevent load from moving.<br>Have adequate escape route if rods fall<br>Ensure all safety rails are up on the side of the vehicle<br>SWP UNDHSE1.09 Housekeeping Work area | 5<br>Low |
| 3 | Ensure sufficient space is provided on the tray of the vehicle to fit the amount of rods required | Untidy or unstable load.<br>Rods moving in tray<br>Rods falling from vehicle. | 21<br>Significant | Ensure the load is packed neatly<br>Do Not exceed Vehicles carrying capacity. | 5<br>Low |
| 4 | Inspect Rope, Tie down Straps, chains & Dogs for any damage. | Chains braking.<br>Ropes snapping.<br>Tie straps snapping. | 21<br>Significant | Ensure Equipment is in good order<br>And is stored correctly for use<br>Ensure current tag<br>SWP UNDGEN 2.28 Secure Load Site | 5<br>Low |
| 5 | Load rods onto vehicle using the correct manual handling techniques.<br>One person lifts pin end on to vehicle, the other person then lifts the box end and slides the rod on to the vehicle pushing down on the box end until the rod is halfway on the vehicle then bring the rod up to the horizontal position and in the same motion push/slide the rod on to the vehicle<br>It may be necessary to get assistance from person number one to fully slide rod up into position. | Personal injury<br>Hand injury<br>Back strains<br>Overload Vehicle | 21<br>Significant | **<u>When performing lifting tasks, follow these basic rules:</u>**<br><br>1. First, test the weight of the load by tipping it. If in doubt, ask for help. Do not attempt to lift a heavy load alone.<br><br>2. Take a good stance. Plant your feet firmly with legs apart, one foot farther back than the other. Make sure you stand on a level area with no oil spots or loose gravel, etc.<br><br>3. Get a firm grip. Use as much of your hands as possible, not just your fingers.<br><br>4. Keep your back straight, almost vertical. Bend at the hips if you bend. | 5<br>Low |

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|---|---|---|---|---|---|
| | | | | 5. Hold load close to your body. Keep the weight of your body over your feet for good balance.<br><br>6. Use large leg muscles to lift. Push up with the foot positioned in the rear as you start to lift.<br><br>7. Lift steadily and smoothly. Avoid quick, jerky movements.<br><br>8. Avoid twisting motions. Turn the forward foot and point it in the direction of the eventual movement.<br><br>9. Never try to lift more than you are accustomed to.<br><br>10. Always get help when you have to lift bulky loads<br><br>WARNING<br><br>Never put your fingers inside the rods as a serious injury can result<br>SWP SURHSE 1.02 Manual Handling<br>Wear gloves to protect hands<br>SWF UNDHSE 1.09 Housekeeping Work area<br>SWP UNDHSE 1.02 Manual Handling<br>Ensure all rods are stacked neatly and supported by adequate stabilizing bars | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.34**
**Title: Load/unload and Set Up Rod Sloop**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
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| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | Check drill site has been prepared | | | | |
| 1 | WARNING<br>**Check for overhead power lines, overhanging trees, possible under round cables** | Personal injury - falling objects — electric shock | 24<br>High | Remove overhanging branches or move rig if permitted<br>Obtain permits regarding overhead cables and underground cables/pipes<br>Notify AMWD supervisor or client if not satisfied with site layout<br>Make a muster point in case of an emergency | 4<br>Low |
| 2 | Pre-start on Rod truck | Equipment damage | 15<br>Moderate | Conduct pre-start inspection as per pre—start book and SWP SURHSE 1.10 Vehicle Daily inspection<br>Licensed driver | 4<br>Low |
| 3 | Start truck and let warm up.<br>Reverse truck to required area<br>Ensuring that the rods are in line with the centre of the mast | Equipment damage | 15<br>Moderate | Licensed driver<br>Ensure mirrors are clean and correctly adjusted<br>Ensure that at least one spotter is present and communication signals are clear before reversing.<br>Ensure sloop and load is secure as per SVVP SURGEN 2.04 Secure Load Site<br>Ensure ground conditions are suitable for the weight of the truck and the load. | 4<br>Low |
| 4 | Shut down truck | | | Before shutdown, if the truck is turbo fitted ensure that you let it idle for 5 minutes | |
| 5 | Conduct pre-start on sloop and assess the load before untying the straps/chains | Equipment damage<br>Personal injury | 15<br>Moderate | Correct use of PPE — gloves<br>Ensure that the load is stable before releasing the straps/chains<br>WARNING<br>It may be necessary to lower the jacklegs before removing the straps/chains if the load has moved to ensure stability<br>SWP SURGEN 2.04 Secure Load Site<br>Follow good housekeeping policies and roll up straps/chains and put in the side box | 4<br>Low |

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|---|---|---|---|---|---|
| 6 | Conduct pre—start on the sloop motor lower the controls and start | Personal injury<br>Equipment damage | 20<br>High | WARNING<br>**Pre-start must be conducted before the sloop is put on the truck and is at its lowest point. This will eliminate the risk of falls from height**<br>Check oil levels, motor and hydraulic, battery levels, ignition system, hydraulic hoses and the general condition of the feet, legs and frame as per pre-start book.<br>Ensure the lockout device works and the pin that holds the controls in place is adequate for the task.<br>If any of the hydraulic system and jack legs are damaged tag the sloop out and report it to your supervisor.<br>SWP SURHSE 1.05 Isolation lockout<br>SWP SURHSE 1.02 Manual Handling | |
| 7 | Extend all four jack legs out completely Check this has been completed.<br>Lower the jack legs on to the jack leg bases/feet so that all legs are just on the ground | Equipment damage<br>Personal injury | 16<br>Moderate | Ensure that at least one spotter is present and communication signals are clear before conducting the task<br>Level the sloop once all legs have taken weight on the ground<br>It may be necessary to use bed logs to stabilize the sloop.<br>PPE—Gloves.<br>SWP SURHSE 1.02 Manual handling | |
| 8 | Put bed legs under jack legs | Personal injury<br>Equipment damage, Sloop sinks and truck can't be removed/driven back under | 16<br>Moderate | Use bed logs to aid in stabilizing the sloop<br>It am be necessary to pig sty bed logs in soft formations<br>SWP SURHSE 1.02 Manual Handling<br>P.P.E. gloves and eye protection. | 4<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.34**
**Title: Load/unload and Set Up Rod Sloop**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | | | | | |
| 9 | Raise the sloop evenly until clear of the truck.<br>Level sloop side to side, front to back | Equipment damage<br>Personal injury | 23<br>High | WARNING<br>**Ensure all personnel are clear of the sloop and its load**<br>**Raise the sloop evenly** | |
| 10 | Start the truck and drive it forward and clear of the sloop<br><br>Stop the truck and shutdown | Personal injury<br>Equipment damage | 23<br>High | **Ensure all personnel are clear of the sloop and its load**<br>**Raise the sloop evenly**<br>Licensed driver<br>Ensure mirrors are clean and correctly adjusted<br>Ensure that at least one spotter is present and communication signals are clear before reversing.<br>Pre—start inspection of truck<br>Apply handbrake and follow shutdown procedures | 7<br>Low |
| 11 | Lower the sloop evenly until at the height you require | Personal injury<br>Equipment damage | 23<br>High | WARNING<br>**Ensure all personnel are clear of the sloop and its load**<br>**Monitor sloop stability as its lowered**<br>**Always ensure the sloop is lowered evenly** | 12<br>Moderate |
| 12 | Stop the motor and raise and lock off the control panel | Personal injury<br>Equipment damage | 12<br>moderate | Ensure the lockout device works and the pin that holds the controls in place is adequate for the task | 4<br>Low |
| 13 | To load the rod sloop | | | | |
| 14 | Follow steps 12 to 9 in reverse order<br>Conduct pre—start on equipment being used, | | 23<br>High | WARNING<br>**Pre—start must be conducted before the sloop is put on the truck and is at its lowest point. This will eliminate** | 7<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURGEN2.34** **Prepared By: Vaughan Cullen**
**Title: Load/unload and Set Up Rod Sloop** **Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | | | | **the risk of falls from height.**<br>Check oil levels, motor and hydraulic, battery levels, ignition system, hydraulic hoses and the general condition of the feet, legs and frame as per pre-start book.<br>Ensure the lockout device works and the pin that holds the controls in place is adequate for the task.<br>If any of the hydraulic system and jack legs are damaged tag the sloop out and report it to your supervisor.<br>SWP SURHSE 1.05 Isolation lockout<br>SWP SURHSE 1.02 Manual Handling<br>**Ensure all personnel are clear of the sloop and its load**<br>**Raise the sloop evenly until it is high enough for the truck to be reversed under.**<br>Licensed driver<br>Ensure mirrors are clean and correctly adjusted<br>Ensure that at least one spotter is present and communication signals are clear before reversing.<br>Pre—start inspection of truck | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURGEN2.36**
**Title: Setting up & Operating Salamander Heater**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Put the safety cage used for the Salamander on a level ground away from any potential fire hazards and obstructed walk ways. Secure to the ground (pin down) to stop it falling over | Personal injury — burns, Fire hazard | 22 High | Ensure safety cage is in place, ensure it is not too close to the work area | 7 Moderate |
| 2 | Put assembly the Salamander in the cage. Refer to manual on instruction to put together | Personal injury - abrasion, cuts | 17 Significant | Correct PPE be worn | 4 Low |
| 3 | Ensure flue is firmly secured and the filler cap/vent is serviceable | | | | |
| 4 | Fuel up salamander with diesel via the fuelling hole to approximately 80% with jerry can and funnel | Environment damage, fire hazards, personal injury | 20 High | Ensure you use a funnel, pour the diesel slowly, ensure no ignition source is around e.g. Smoking, wear correct PPE, ensure a fire extinguisher is readily available and is fully serviced | 4 Low |
| 5 | Ensure butterfly V/V is latched open | Hand Injury | 11 Moderate | Correct PPE- wear gloves | 4 Low |
| 6 | Light Salamander | Personal injury — burns | 23 High | Use proper ignition source and do not put your face too close to the ignition area | 4 Low |
| 7 | When Salamander is lit, close filler cap/vent ensuring 3 vent openings are visible | | | | |
| 8 | When shutting down - half an hour prior to end of shift, ensure butterfly valves and vents are closed | Hand Injury | 20 High | Correct PPE- wear gloves | 4 Low |
| 9 | If you need to re—fuel — wait until the Salamander is cold, **DON'T REFUEL WHILE HOT OR RUNNING** | Personal injury — burns Fire hazard – Explosions | 20 High | Correct PPE, wait until Salamander is cold before refuelling | 4 Low |
| 10 | Refuelling steps as from step 3 and 4 | Environmental Damage, fire hazards, personal injury | 20 High | Ensure you use a tunnel, pour the diesel slowly, and ensure no ignition source is around eg. Smoking, wear correct PPE, ensure a fire extinguisher is readily available and is fully serviced | 4 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.01** **Prepared By: Vaughan Cullen**
**Title: Compressor Safety** **Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Check pressure relief valve weekly to ensure it has not blocked, seized or disabled. | Compressor explosion - high pressure air | 25 High | WARNING<br>HIGH PRESSURE AIR IS DANGEROUS; IF UNSURE SEEK ADVICE FROM YOUR SUPERIORS.<br>Check valve weekly — do not stand in path of air flow<br>Check relief valve is in service and tagged.<br>Report any problems immediately to you supervisor and fitter.<br>Refer to operators manual for additional information | |
| 2 | Select air hoses, air tools etc that are rated to compressor output | Personal injury — compressed air | 24 High | Check ratings on tools and air hoses<br>Hoses are stamped and in date<br>Check condition of hoses | |
| 3 | WARNING<br>**HIGH PRESSURE AIR.**<br>Secure all hose connections by using socks over hoses and rated "D" shackles or other approved restraining device to prevent tools or hose end from being accidentally expelled.<br>Check fire suppression and fire extinguishers are tagged and in service | Personal injury — compressed air | 25 High | Pre—start inspections<br>Make sure all hoses are fitted with whip checks in the form of socks.<br>Make sure all hose fittings are secure and socks are secured by the use of "D" shackles.<br>PPE: Gloves, eye and ear protection.<br>Check tagging of fire equipment<br>Signage is in place<br>Inductions and training of NO GO areas. | |
| 4 | Open fluid filler cap only when compressor is not running and is not pressurised.<br>Drain water filter trap for condensation etc. | Personal injury — compressed air | 24 High | Shut down compressor and bleed receiver to zero pressure before removing cap | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.01**
**Title: Compressor Safety**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 5 | Vent all internal pressure before opening any hose, valve, drain plug connection or other component | Personal injury — compressed air | 24 High | Shut down compressor and bleed receiver to zero pressure before removing cap.<br>IE: Open air vent tap and drain tap at bottom underside of control panel.<br>Gloves, eye and ear protection, | 7 Moderate |
| 6 | Keep personnel out of line with and away from the discharge opening of hoses or tools or other points of compressed air discharge | Personal injury — compressed air | 25 High | Never direct compressed air towards body<br>Inductions and training of no go areas.<br>Site layout plan. | 7 Moderate |
| 7 | WARNING<br>**Do not engage in horseplay with air hoses as death or serious injury may occur** | Personal injury — compressed air | 25 High | Never direct compressed air towards body<br>Inductions and training of no go areas.<br>SWP SURHSE isolate compressor | 7 Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.02**
**Title: Compressor Start Up**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Prior to start up, check cleanliness and make sure that nothing is obstructing the flow of cooling air through the fluid coolers and radiators | Equipment damage due to over-heating. | 18 Moderate | Read SWP SURAIR 3.01 Compressor Safety.<br>Read SWP SURHSE 1.07 Isolated compressor<br>Ensure coolers are clean.<br>Pre—start inspection.<br>Grease fan hub, if applicable.<br>Grease butterfly if applicable.<br>Monitor temperatures and pressures while equipment is operating.<br>Signage ·<br>Tagged fire equipment | 9 Low |
| 2 | Check engine oil, water and fuel levels. Top as required. | Personal injury. Burns from hot machinery and fluids.<br>Fall from side of rig/compressor | 21 High | Pre-start inspection.<br>Grease fan hub, if applicable.<br>Grease butterfly, if applicable.<br>Use ladders and hand and foot holds when climbing on to machinery.<br>SWR SURDIA 5.27 Mount/Dismount Work Platform<br>Be aware equipment could be hot.<br>Signage, guarding and lagging is in place.<br>Release radiator cap slowly. | 8 Moderate |
| 3 | Check compressor fluid level is half way up receiver tank sight glass. Top up as required. | Personal injury – compressed air. | 24 High | Never attempt to fill receiver tank unless engine is shut down and pressure is bled off.<br>IE: Open air vent tap and drain tap at bottom underside of control panel.(Refer to operators manual)<br>Contact supervisor if unsure. | 7 Moderate |
| 4 | Drain control line moisture separator daily | Personal injury — compressed air | 25 High | Ensure shut is down engine and bleed oft pressure.<br>IE: Open air vent tap and drain tap at bottom underside of control panel.(Refer to operators manual)<br>Contact supervisor if unsure. | 8 Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR 3.02**
**Title: Compressor Start Up**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 5 | Close service valve and check air taps are in the correct position, | Uncontrolled release of air on start up. | 24 High | WARNING<br>**HIGH PRESSURE AIR IS DANGEROUS AND CAN RESULT IN DEATH.**<br>Refer to Operators manual<br>Contact supervisor if unsure.<br>Ensure service valve is closed.<br>Refer to SURAIR 3.01 Compressor Safety | |
| 6 | Place selector in "Low'" pressure position | Equipment damage.<br>Compressor staring under load. | 12 Moderate | Select low pressure or start position depending on make and model of compressor | 5 Low |
| 7 | Start engine | Personal injury | 13 Moderate | Inductions<br>Signage and or barricading is in place<br>Ensure all personal are clear of equipment and aware that the equipment is about to be started | 5 Low |
| | Check all instruments are working correctly | | | | |
| 8 | Check air filter indicators, clean or replace it necessary | Personal injury — compressed air | 23 High | Never direct compressed air towards any part of the body.<br>Air pressure shall not exceed 30 PSI<br>Correct PPE<br>Never clean safety inner filter. | 4 Low |
| 9 | When operating temperature reaches 71°C compressor is ready to use | | | | |
| 10 | Before shutdown, close service valve and place selector in low pressure position | | | | |
| 11 | Run compressor for 5 minutes before shutdown | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR 3.02**
**Title: Compressor Start Up**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 12 | Prior to start up, check cleanliness and make sure that nothing is obstructing the flow of cooling air through the fluid coolers and radiators | Equipment damage due to over-heating. | 18<br>Moderate | Read SWP SURAIR 3.01 Compressor Safety.<br>Read SWP SURHSE 1.07 isolate compressor<br>Ensure coolers are clean.<br>Pre—start inspection,<br>Grease fan hub<br>Grease butterfly if applicable.<br>Monitor temperatures and pressures while equipment is operating.<br>Signage<br>Tagged fire equipment | 9<br>Low |
| 13 | Check engine oil, water and fuel levels. Top as required. | Personal injury. Burns from hot machinery and fluids.<br>Fall from side of rig/compressor | 21<br>High | Pre—start inspection.<br>Grease fan hub<br>Grease butterfly if applicable.<br>Use ladders and hand and foot holds when climbing on to machinery.<br>SWP SURDIA 5.27 Mount/Dismount Work Platform<br>Be aware equipment could be hot.<br>Signage, guarding and lagging is in place<br>Release radiator cap slowly. | 8<br>Moderate |
| 14 | Check compressor fluid level is halt way up receiver tank sight glass. Top up as required. | Personal injury – compressed air. | 24<br>High | Never attempt to fill receiver tank unless engine is shut down and pressure is bled off.<br>IE: Open air vent tap and drain tap at bottom underside of control panel.(Refer to operators manual)<br>Contact supervisor if unsure. | 7<br>Moderate |
| 15 | Drain control line moisture separator daily | Personal injury – compressed air. | 24<br>High | Ensure shut is down engine and bleed off pressure.<br>IE: Open air vent tap and drain tap at bottom underside of control panel.(Refer to operators manual)<br>Contact supervisor if unsure. | 8<br>Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR 3.02** **Prepared By: Vaughan Cullen**
**Title: Compressor Start Up** **Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 16 | Close service valve and check air taps are in the correct position. | Uncontrolled release of air on start up | 24<br>High | WARNING<br>**HIGH PRESSURE AIR IS DANGEROUS AND CAN RESULT IN DEATH.**<br>Refer to Operators manual<br>Contact supervisor if unsure.<br>Ensure service valve is closed.<br>Refer to SURAIR 3.01 Compressor Safety | 9<br>Low |
| 17 | Place selector in "Low" pressure position | Equipment damage<br>Compressor starting under load | 12<br>Moderate | Select low pressure or start position depending on make and model of compressor | 5<br>Low |
| 18 | Start engine | Personal injury | 13<br>Moderate | Inductions<br>Signage and or barricading is in place<br>Ensure all personal are clear of equipment and aware that the equipment is about to be started | 5<br>Low |
| 19 | Check all instruments are working correctly | | | | |
| 20 | Check air filter indicators, clean or replace if necessary | Personal injury – compressed air. | 23<br>High | Never direct compressed air towards any part of the body.<br>Air pressure shall not exceed 30 PSI<br>Correct PPE<br>Never clean safety inner filter. | 4<br>Low |
| 21 | When operating temperature reaches 71°C compressor is ready to use. | | | | |
| 22 | Before shutdown, close service valve and place selector in low pressure position | | | | |
| 23 | Run compressor for 5 minutes before shutdown | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.02**
**Title: Compressor Start Up**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 24 | Bled off air out of system and change taps over if water drilling. | | | WARNING<br>Ensure engine is shut down and bleed off pressure.<br>IE: Open air vent tap and drain tap at bottom underside of control panel. (Refer to operator's manual and signage on control panel). Contact supervisor if unsure.<br>Then open booster inlet tap and close air delivery and booster return tap so compressor doesn't fill up with water. | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR 3.03** **Prepared By: Vaughan Cullen**

**Title: Sandvik Rod Handler** **Approved By: Vaughan Cullen**

**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Prepare for rod handling Connect Control Power Loom to mast before connecting to Joystick Control – stops possibility of uncontrolled activation resulting in potential crush injury | Personal injury – crush<br>Equipment damage | 20<br>High | 1. NEVER operate loader whilst personnel are near Right Hand Side of mast.<br>2. NEVER stand under loader while rods in loader.<br>3. NEVER slew into mast unless Loader is parallel to mast.<br>3. ALWAYS have Rod Cup facing into mast- NEVER facing away from mast when slewed into mast.<br>4. OPERATOR must ALWAYS be in a position where he can clearly see both the Driller and the Rod Bin. | 5<br>Low |
| 2 | Training | Personal injury – non competent operator | 20<br>High | Ensure operator has been trained in the use of the UDR—Sandvik rod handling system, and is familiar with content of manufacturers Operator Manual and the functions of the unit. | 5<br>Low |
| 3 | Connect power. Always connect Control Power Loom to mast before connecting to Joystick<br>Control - stops possibility of uncontrolled activation resulting in potential crush injury. | Personal injury. Crush<br>Equipment damage | 13<br>High | 1. NEVER operate loader whilst personnel near Right Hand Side of mast<br>2. NEVER stand under loader while rods in loader.<br>3. NEVER slew into mast unless Loader is parallel to mast.<br>3. ALWAYS have Rod Cup facing into mast- NEVER facing away from mast when slewed into mast.<br>4. OPERATOR must ALWAYS be in a position where he can clearly see both the Driller and the Rod Bin. | 6<br>Low |
| 4 | Position rod bin. | | | | |
| 5 | Operation of cup.<br>Rotate Cup 1800 ready to pick up next rod.<br>Repeat steps 6-10 to continue running rod | | | | |
| 6 | Lift rod and make sure head is up before slewing into mast. | Personal injury. Equipment damage | 8<br>Moderate | At no time shall any body part come between the moving rod and an stationary object | |
| 7 | Make up rotation head. | | | Keeping Rod Whip arms engaged, Driller lowers pin thread into top of rod in slips table and makes up joint. | 5<br>Low |
| 8 | Make up to drill string. | Equipment damage | 8<br>Moderate | Use slow rotation. | 3<br>Low |
| 9 | Prepare to handle next rod. | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR 3.04**
**Title: Rod Pull with Rod handler**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**
**Reviewed by: Vaughan Cullen**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Prepare to pull rods,<br><br>ALWAYS connect<br>Control Power Loom mast before connecting to Joystick Control- stops possibility of<br>Uncontrolled activation resulting in potential crush injury | Personal injury. Crush, sprain and strain<br><br>Equipment damage | 20<br>High | NEVER operate loader whilst personnel near Right Hand Side of mast. NEVER stand under loader while rods in loader. NEVER slew into mast unless Loader is parallel to mast.<br>ALWAYS have Rod Cup facing into mast - NEVER facing away from mast when slewed into mast.<br>OPERATOR must ALWAYS be in a position where he can clearly see both the Driller and the Rod Bin. Control Power Loom to mast before connecting to Joystick Control — stops possibility of uncontrolled activation resulting in potential crush injury. NEVER operate loader whilst personnel near Right Hand Side of mast.<br>NEVER stand under loader while rods in loader<br>NEVER slew into mast unless Loader is parallel to mast.<br>ALWAYS have Rod Cup facing into mast- NEVER facing away from mast when slewed into mast.<br>A Rod Clamp on Rod Arm to be used ONLY to push / pull rods in/out of side load Rod Bin — clamp to be open at all other times,<br>OPERATOR must ALWAYS be in a position where he can clearly see both the Driller and the Rod Bin<br>Conduct Pre—start inspection<br>Grease movable parts regularly | 5<br>Low |
| 2 | Training | Personal injury and Damage to equipment –<br>Non competent operator | 20<br>High | Ensure operator has been trained in the use of the UDR—KL rod handling system No untrained employee to operate | 5<br>Low |
| 3 | Connect power. | | | Ensure power to the unit is switched on at the control panel. Failure to do so will render electrical functions and sentinels inoperable. | 5<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR 3.04** **Prepared By: Vaughan Cullen**
**Title: Rod Pull with Rod Handler** **Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 4 | Rod pulling cycle.<br>Driller pulls rod into mast and secures string in slips table with rod spanner Break top and bottom joints of rod, float bottom joint from top of rod in slips table.<br>Lift rod from string, holding central with Rod Whip arms engaged<br>Slew table into mast<br>Note: There will be a slight delay as Rod Arm Kicker up mast extends into position.<br>Lower suspended rod into Cup, disengage Rod Whip arms and float Rotation head from rod. Slew table out of mast.<br>Driller runs head down to pick up string to continue pulling out Rotate Cup 1800 ready to lower onto Sideload Rod Bin. Tilt Cup clockwise (CW) to lower rod into Rod Bin until rod parallel to Rod Bin. Table may have to be raised or lowered to align rod with bin. Close clamp on rod and tram rod from Cup onto rod bint | Personal injury | 13<br>Moderate | WARNING<br>**At no time shall any body part come between the moving rod and any stationary object**<br>**Offsider to ensure head is fully up before engaging rod slew function.**<br>**Driller to ensure rod is fully slewed out before engaging in head traverse down motion.**<br>**Communication.**<br>**Training to the task.** | 6<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR 3.04**
**Title: Rod Pull with Rod Handler**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 5 | Prepare for next cycle.<br>Tilt Cup counter clockwise (CCW) raising Rod Arm until parallel with mast. Rotate Cup 180° ready to slew table back into mast. | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR 3.05** **Prepared By: Vaughan Cullen**

**Title: Running/Pulling RC Rods** **Approved By: Vaughan Cullen**

**Note: SURAIR3.05 replaces SURAIR3.06** **Revision Date: 8th Oct. 2010 Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Prior to any rod handling operations, check all shackles, and fittings are tight, swivels are moving freely and all parts of the rod handling assembly, including rod handling winch rope, clamshell, cable / chain and hook are in good working order, | Personal injury hands.<br>Wrong size clamshell, failure of worn and/or damaged parts resulting in potential for rod to fall in an uncontrolled manner. | | Conduct Pre-start inspections<br>Correct use of hand tools.<br>Wear gloves.<br>Check all parts of the rod handling assembly. Replace as necessary. Ensure the clamshell is the correct size for the rods that are in use.<br>Note: Count and record the number of rods before starting rod handling operations. | 4<br>Low |
| 2 | Remove caps and check "o" rings, replace as necessary. | | | Worn or missing "O" ring will allow air to pass resulting in a loss of downhole tool performance. | |
| 3 | Connect clamshell chain and hook to winch cable | Personal injury. Hands<br>Shackles coming loose. | | Wear gloves. Ensure the shackle is tight.<br>Check tag is in date. | 4<br>Low |
| 4 | Slide clamshell over rod with hook in pin end, remove slack from chain cable | Personal injury. Hands | | Wear gloves. | 4<br>Low |
| 5 | Driller lifts rod with winch and swings boom in.<br>Offsider holds hook and once rod pin reaches top of rod bin lifts up using the weight of the winch and walks with rod to mast end of rod platform.<br>Offsider passes rod to Offsider on the deck.<br>Driller continues to lift rod until in a workable position. | Personal injury<br>Lifting gear failure | 8<br>Moderate | Conduct Pre-start inspections<br>Correct use of hand tools.<br>Wear gloves.<br>Check all parts of the rod handling assembly. Replace as necessary. Ensure the clamshell is the correct size for the rods that are in use.<br>Ensue lifting gear is tagged and in service, replace as necessary.<br>Communication and training in the task.<br>Never stand under suspended load | |
| 6 | Line box end of rod up with drill | Personal injury – rod kicks | 16 | Always stand to one side of rod when connecting to head | 4 |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.05** **Prepared By: Vaughan Cullen**
**Title: Running/Pulling RC Rods** **Approved By: Vaughan Cullen**
**Note: SURAIR3.05 replaces SURAIR3.06** **Revision Date: 8th Oct. 2010 Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | spindle then lower head slowly to bring the two together. | out. | Moderate | Never stand in line with rod.<br>Slow smooth lever operation<br>WARNING<br>**Use head traverse rather than winch to take up last bit of slack for more control.**<br>Wear gloves.<br>Refer to SWP SURDIA 5.17 Add/Remove rod Clamshell. | Low |
| 7 | Drill assistant holds hook in left hand and uses right hand to line up drill rod | Personal injury – hands caught in hook | 23<br>High | Hold hook in left hand to avoid getting it caught<br>Hold hook in left hand with thumb in upright position. If this grip is maintained and rod kicks hand will be flung clear.<br>Use right hand as a steadier on rod<br>Gloves | 7<br>Moderate |
| 8 | WARNING<br>**Use slow reverse rotation to make up thread.** | Personal injury. | 21<br>High | Hold hook in left hand to avoid getting it caught<br>Hold hook in left hand with thumb in upright position. If this grip is maintained and rod kicks hand will be flung clear.<br>Use right hand as a steadier on rod.<br>Gloves | 5<br>Low |
| 9 | Raise head to release hook. Lower winch to remove clamshell from rod and then boom is swung outwards. | Personal injury. Equipment damage. Rod drops | 21<br>High | Ensure rod is made up to head before removing hook and clam shell.<br>Never place body or hands under suspended load.<br>Drill Assistant to tighten by hand before removing hook (if unsure).<br>Gloves | 5<br>Low |
| 10 | Lower rod to make up thread with rod in slips | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURAIR3.05** **Prepared By: Vaughan Cullen**
**Title: Running/Pulling RC Rods** **Approved By: Vaughan Cullen**
**Note: SURAIR3.05 replaces SURAIR3.06** **Revision Date: 8th Oct. 2010 Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 11 | Lift drill string and remove rod spanner, ready to commence drilling. | Personal injury – hands | 24 High | Make sure driller has finished moving rods before removing spanner | 4 Low |
| 12 | Repeat steps 4 to 14 until the required number of rods have been lowered into the hole. | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.05** **Prepared By: Vaughan Cullen**

**Title: Running/Pulling RC Rods** **Approved By: Vaughan Cullen**

**Note: SURAIR3.05 replaces SURAIR3.06** **Revision Date: 8th Oct. 2010 Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | ***Pulling RODS*** | | | | |
| 13 | Breakout bottom join using breakouts and unscrew.<br>Back up and loosen top join with stilsons,<br>Remove stilsons,<br>Offsider steps back and driller lifts rod up. | Personal Injury<br>Rod falls | 22<br>High | Inspect stilsons hook / heels and handles replace if necessary.<br>SWP SURGEN 2.19 Stilson Use<br>SWP SURGEN 2.20 Using Breakout Stilsons<br>SWP COALGEN 13.02 Using Modified Stilsons<br>Protector plate and handle on stilsons and signage is in place<br>Do not place hands on stilsons when ram extending or retracting<br>PPE gloves ensure stilsons are in good order<br>Use handle provided.<br>Slowly engage lever<br>Wear PPE gloves.<br>WARNING<br>**Ensure good communication and look at positioning of stilsons and hands/fingers before engaging rotation** | |
| 14 | WARNING<br>**Use slow reverse rotation to make undo rod** | Hook grabs & spins<br>personal injury<br>Rod drops | 23<br>High | Hold hook in left hand with thumb in upright position. If this grip is maintained and rod kicks hand will be flung clear.<br>Use right hand as a steadier on rod.<br>**Only lift head enough to take excessive tension off clamshell rope.**<br>Gloves | |
| 15 | Hoist clamshell up the rod and fit the | Personal Injury. Struck by rod | 13 | Offsider shall stand to the side of the rod. Ensure the cable. | 6 |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.05**
**Title: Running/Pulling RC Rods**
**Note: SURAIR3.05 replaces SURAIR3.06**
**Revision Date: 13th March 2009**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Assessment Team Members: Vaughan Cullen**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | hook into the in end of the rod. | | Moderate | And hook is free to be pulled up the rod. | |
| 16 | Take the weight on the rod handling winch and using slow rotation only, unscrew the top join.<br>Reduce excessive Tension on the winch cable by lifting the head slightly. | Personal Injury. Rotating parts.<br>Falls. | 13<br>Moderate | Hold hook in left hand with thumb in upright position, If this grip is maintained and rod kicks hand will be flung clear.<br>Use right hand as a steadier on rod.<br>WARNING<br>**Only lift head enough to take excessive tension off clamshell rope when unscrewing thread.**<br>Gloves<br>Offsider assists by using the hook to hold the pin end of the rod directly over the box end of the rod in the slips table.<br>Refer to SWP SURDIA 5.17 Add/Remove Rod Clamshell. | 6<br>Low |
| 17 | Guide the rod into the rod bin and lower.<br>**This is a reversal of step 5 Running rod.** | Personal Injury. Manual Handling.<br>Crush | 16<br>Moderate | Conduct Pre—start inspections<br>Correct use of hand tools.<br>Wear gloves. '<br>Check all parts of the rod handling assembly. Replace as necessary. Ensure the clamshell is the correct size for the rods that are in use.<br>Ensue lifting gear is tagged and in service, replace as necessary.<br>Communication and training in the task.<br>Never stand under suspended load<br>Ensure sound footing<br>Ensure all ladders and walkways are secure<br>Ensure all walkways have safety rails.<br>At no time shall any body part come between or be under the moving rod and any stationary object, Offsider controls the | 5<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURAIR3.05** **Prepared By: Vaughan Cullen**
**Title: Running/Pulling RC Rods** **Approved By: Vaughan Cullen**
**Note: SURAIR3.05 replaces SURAIR3.06** **Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | | | | pin end of the rod and guides it into the rod box and pulls the rod to the end of the box as the driller lowers the rod. | |
| 18 | Remove the hook end clamshell read to pull the next rod. | Personal Injury. Manual Handling. | 4<br>Low | Correct manual handling.<br>SWP SURHSE 1.02 Manual Handllng. | 6<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.07**
**Title: Breakout/Makeup Hammer**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Prepare to break out hammer | Personal injury Hand tools<br>trip and fall | 13<br>Moderate | Ensure work area is free of hazards & all appropriate equipment is good working order ie. No cracks and jaws are in good condition.<br>SWP SURGEN 2.19 Stilson Use<br>SWP SURGEN 2.20 Using Breakouts | 5<br>Low |
| 2 | Set hammer in bit basket. | Personal injury. Lifting<br>Rotating equipment. Crush. | 13<br>Moderate | Screw rotation head into hammer sub. Transverse rotation head up until hammer is clear of the slips table. At no time shall any body part come between the moving hammer and any stationary object. Wear gloves. Place appropriate sized bit basket in slips table and lower hammer onto bit basket making sure the bit is properly located. | 6<br>Low |
| 3 | Break out joint<br>WARNING<br>**ENSURE ALL PERSONNEL ARE CLEAR OF WORK AREA** | Equipment damage. | 4<br>Low | VVhen work area is clear of personnel, retract breakout arm to crack the thread between the drive sub and the hammer case. | 1<br>Low |
| 4 | Pull back to replace bit. | Personal injury. Crush.<br>Lifting. | 13<br>Moderate | Remove rap span from around the hammer, traverse rotation head up high enough to replace the hammer bit.<br>Gloves | 6<br>Low |
| 5 | Make up join. | Personal injury. Crush. | 13<br>Moderate | At no time shall any body part come between the moving hammer, bit and any stationary object. When hammer bit ' has been replaced, traverse rotation head back down and relocate bit into bit basket Use rotation head to toque hammer back up.<br>Don't over torque.<br>Refer to manufactures specifications. | 6<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.07**
**Title: Breakout/Makeup Hammer**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 6 | Breakout the other joins of the hammer in the same procedure except use spanner flats and stilsons. | Equipment damage<br>Personal injury | 20<br>High | **Take care when using stilsons on the barrel or shroud of the hammer it will squash.**<br>Gloves.<br>SWP SURGEN 2.19 Stilson Use | |
| 7 | Make up of threads is in reverse order. | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.08**
**Title: Removing & Replacing RC Bits**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Ensure hammer is screwed tightly onto drill head. | Hammer unscrews while undoing bit. | 18 Moderate | Ensure hammer is made up tightly to drill head. | 3 Low |
| 2 | Lift hammer up above slips table | | | | |
| 3 | Place bit breaker in slips table | Personal injury hands | 12 Moderate | Wear gloves. Never place hands between bit breaker and slips table. | 3 Low |
| 4 | Lower hammer until bit sits in bit breaker basket. | Personal injury hands.<br>Equipment damage | 18 Moderate | Driller's assistant guides bit into bit breaker. At no time shall any boy part come between the moving hammer and any stationary part. | 3 Low |
| 5 | Using breakout crack thread between driver sub and barrel. Only use reverse rotation if absolutely necessary. | Break out tongs slip<br>Personal injury | 21 High | Correctly adjust and place stilson jaws on hammer. Stand clear while threads are being broken. | 9 Moderate |
| 6 | Once thread is cracked remove chain tongs. | Personal injury Hands.<br>Pinch points | 18 Moderate | Wear gloves. Keep hands clear of pinch points | 5 Low |
| 7 | Using reverse rotation undo driver sub to loosen bit. | Equipment damage.<br>Threads. | 7 Moderate | Lift head back to take weight off threads as they unscrew. | 1 Low |
| 8 | Lift rotation head with hammer slowly, to lift hammer and bit clear of bit basket. | Personal injury. Hands<br>Parts falling out of hammer. | 12 Moderate | Keep hands clear of hammer and bit until hammer is lifted 40cm clear of bit | 5 Low |
| 9 | Place something over slips table to cover hole.<br>Offsider holds bit and driller slowly rotates hammer with reverse rotation | Personal injury. Hands<br>Sprains and strains. | 18 Moderate | Wear gloves. Use correct manual handling technique | 5 Low |
| 10 | While bit is out of hammer check inner tube. | Personal injury Hands cut. | 7 Moderate | Wear glove as a worn inner tube can be very sharp. | |
| 11 | Remove bit, shroud, driver sub and bit retaining rings. | Personal injury | 18 Moderate | Follow correct Manual Handling procedure<br>Train and assess employee on this work instruction. | 4 Low |
| 12 | Check buttons, spline shroud etc on replacement bit to ensure correct size and condition. | Wrong bit, shroud & shank size. | 12 Moderate | Replacement bit must be same size or smaller than the bit it is replacing so it will fit down the hole. | 3 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.08** **Prepared By: Vaughan Cullen**

**Title: Removing & Replacing RC Bits** **Approved By: Vaughan Cullen**

**Revision Date: 13th March 2009** **Assessment Team Members: Vaughan Cullen**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 13 | Assemble bit shroud driver sub and retaining ring. | Personal injury hands.<br>Sprains & strains | 12<br>Moderate | Wear gloves. Correct manual handling. | 5<br>Low |
| 14 | Grease threads on driver sub | | | | |
| 15 | Ensure hammer is at height where bit can easily be lifted into place. | Personal injury – lifting | 20<br>High | Follow correct manual handling Procedure<br>Train employee on this work instruction. | 4<br>Low |
| 16 | Offsider holds bit up into hammer, and driller uses slow forward rotation to engage thread | Personal injury – lifting | 18<br>Moderate | Correct manual handling. | |
| 17 | Place bit basket into slips | Personal injury hands.<br>Pinch points | 18<br>Moderate | Driller's assistant to guide barrel over bit shank. Keep hands clear of pinch points between bit and barrel. | 5<br>Low |
| 18 | Lower hammer and guide bit into bit basket | Equipment damage. | 7<br>Moderate | Place a piece of rope behind barrel of hammer and Pull to guide barrel onto bit driver sub. | |
| 19 | Making sure everyone is clear, tighten bit to 50 Bar. | Bit / hammer spins off. | 21<br>High | Make sure bit is secure in bit Breaker – stand clear. | 4<br>Low |
| 20 | Lift hammer out of bit breaker and remove breaker Basket. | Personal injury — Manual handling | 18<br>Moderate | Follow correct manual handling procedures. | 4<br>Low |
| 21 | Remove cover from hole | | | | |
| 22 | Guide hammer into hole. | Personal injury | 18<br>Moderate | At no time shall hands or any body part be placed between moving hammer and any part of the rig or the ground. | 5<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.09**
**Title: Assembly of RC Hammer**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Assure all parts have been washed in diesel and rinsed in fresh water | Diesel splash in eye<br>Eye injury | 21<br>High | Wear protective glasses.<br>Gloves | |
| 2 | Wipe all parts dry with a clean rag and stand cylinder upright. (internal lip at bottom) | | | | |
| 3 | Oil the inside of the cylinder and insert the drive sub bush with the tapered shoulder facing up. | Drive sub bush difficult to push all the way down | 4<br>Low | Dump cylinder on clean wood surface | 2<br>Low |
| 4 | Oil the outside of the inner sleeve and push into cylinder until bottom of sleeve sits flush on top of the drive sub bush. | Inner sleeve inserted incorrect hammer not working | 12<br>Moderate | Holes closest to the end on inner sleeve must face up<br>Ask for assistance | 4<br>Low |
| 5 | Oil inside of inner sleeve, oil piston and insert piston into the inner sleeve with "nose" downwards. | Using hands to spread oil on inner sleeve.<br>Steel splinter, cut hands | 7<br>Moderate | Use rag when spreading oil or just pour oil over and inside sleeve and turn sleeve | 4<br>Low |
| 6 | Check the distributor "O" Ring, replace it necessary and insert distributor | | | | |
| 7 | Inspect “O" Ring on sample lube, replace it necessary, oil sample tube and push into distributor until shoulder of sample tube sits flush on distributor. Align top and bottom sample tubes with distributor and check valve guide. | | | | |
| 8 | Insert check valve guide | | | | |
| 9 | Place the urethane and make up ring over the check valve guide if required. | | | | |
| 10 | Inspect the check valve seat and replace if necessary and put check valve plunger with spring into the check valve guide | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.09**
**Title: Assembly of RC Hammer**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 11 | Grease thread of top sub and screw into cylinder by hand. Back off one turn then screw down again and check make—up is between 1.5 and 2.5mm. | | | | |
| 12 | Check the two “O" Rings on the bottom and the two "O” rings on the top of the adaptor pipe and seat the adaptor pipe inside the top sub. | | | | |
| 13 | Install the circlip using circlip pliers. | | | | |
| 14 | Put drive sub over bit shank | | | | |
| 15 | Inspect the "O" Ring of the split bit retaining ring and place the retaining ring over the bit shank resting on the drive sub | | | | |
| 16 | Place the shroud over the bit shank, grease the drive sub thread and screw drive sub with bit into the cylinder. Make sure the shroud has got the desired gauge. | | | | |
| 17 | Screw protector cap into top sub.<br>Store hammer in an upright position in a dry place | Heavy lift — one person lifts hammer, back injury | 4<br>Low | Two persons must lift the hammer. Safe manual working procedures.<br>Gloves<br>SWP SURHSE 1.02 Manual Handling | 4<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.10** **Prepared By: Vaughan Cullen**

**Title: RC Collar and Install Stuffing Box** **Approved By: Vaughan Cullen**

**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Lower open hole hammer into slips table | Personal injury. Manual handling.<br>Lifting Crush.<br>Pinch | 13<br>Moderate | Pre—start inspection<br>Tagging of lifting gear.<br>Use main winch.<br>At no time shall any body part come between the moving hammer and any stationary object. Keep hands away from gap between bit and drive sub.<br>SWP SURHSE 1.01 PPE<br>gloves<br>SWP SURHSE 1.02 Manual handling | 9<br>Moderate |
| 2 | Add a rod | | | | |
| 3 | Drill collar to casing depth.<br>(This will depend on ground conditions, water, hole design). | Personal injury. Rotating equipment. Dust. | 13<br>Moderate | Refer to SWP SU RAIR 3.01 Compressor Safety<br>Refer to SVVP SURAIR 3.02 Compressor Start.<br>Refer to operator's manual for specific rig to adjust holdback.<br>Correct PPE Safety glasses, eye and ear protection<br>Inductions and training of no go areas.<br>Signage in place.<br>Keep clear of rotating parts. Ensure spin guard is in place<br>All personal shall stay well clear of any rotating equipment.<br>Use low air to start the hole and reduce the amount of dust.<br>Place burlap or similar around slips table and hole collar to catch sample and control dust.<br>Water inject if necessary to control dust | 6<br>Moderate |
| 4 | Pull out rods and hammer.<br>Cover hole | | | Refer to SWP SURAIR 3.05 Pull/Run RC Rods<br>SWP SURAIR 3.07 Break/Make up hammer | |
| 5 | Cut PVC to suit depth of collar and run into hole. | Personal injury. Hand tools<br>Manual handling. | 4<br>Low | Correct use of hand tools.<br>Correct manual handling.<br>SWP SURHSE 1.02 Manual Handling<br>Measure amount needed for stuffing box | 1<br>Low |
| 6 | Place stuffing box onto PVC with rubber or plastic holds it in place. | Personal injury. Manual handling.<br>Lifting Crush.<br>Pinch | 8<br>Moderate | Use two—man lift. Place rod spanner or wooden block over stuffing box and push down slowly with hammer until seating ring is on top of PVC. Pull back remove spanner wooden block. | 3<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.10** **Prepared By: Vaughan Cullen**
**Title: RC Collar and Install Stuffing Box** **Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 7 | Lower hammer through stuffing box about 1m to centralise PVC in the hole.<br>Mix A& B foam or cement, pour around PVC. | Personal injury. Chemical handling. | 13<br>Moderate | Wear correct PPE Gloves Safety Dust Mask.<br>Read MSDS on chemical being used.<br>First aid Kits<br>Refer to SVVP on manual handling<br>As a guide 2 kg cement and 1 lt of water will produce 1.65 its of cement slurry.<br>Mix and circulate cement<br>Offsider to guide hammer. Driller to be aware at all times location of offsider's hands. Maintain good communication. If in any doubt, STOP. Follow manufactures instructions to mix A&B Foam.<br>Check MSDS | |
| 8 | Secure stuffing box hose. Walt for A&B foam to set | Personal injury.<br>Manual handling. | 8<br>Moderate | Stuffing box hose shall to be secured to a small cyclone located at least 10 metres from driller, or a dust collector, or some other means that will maintain the security of the hose throughout the drilling operations. | 3<br>Low |
| 9 | Commence RC drill | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.11** **Prepared By: Vaughan Cullen**

**Title: Setting Rotation – Percussion Drilling** **Approved By: Vaughan Cullen**

**Note: SURAIR3.11 REPLACES SURAIR3.12** **Revision Date: 8th Oct. 2010 Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Pull the high—low gear selection lever into low gear (22.5:1) ration | | | Beware of excessive head rod vibration and engage automatic rod whip guard if rod speeds exceed 150 rpm.<br>Use safety cage. | |
| 2 | Fully increase slow rotation speed control to get a maximum slow rotation speed of 30 rpm | | | | |
| 3 | ALWAYS USE THE SLOW ROTATION LEVER WHEN ADDING RODS. NEVER USE THE MAIN ROTATION LEVER AS IT IS TOOTOUCHY AND COULD RESULT IN SERIOUS INJURY IF THE ROTATION GETS OUT OF CONTROL! ENSURE THE SLOW ROTATION SPEED IS SET NO HIGHER THAN 30 RPM | Personal Injury – rod breakage | 23<br>High | Use slow rotation lever only when making up threads | 4<br>Low |
| 4 | When adding a drill rod ("making" the joint with the rotation head).<br>Set your torque limiter so when the rod is made up it doesn‘t exceed 50 bar | | | Beware of head rod buckling due to excessive pulldown. | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.13**
**Title: Safe Handling – Blow Down Sub**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Unscrew rod on rotation spindle from rod at slips table with rod spanner | Personal injury – hands | 21 High | Keep hands clear at all times | 7 Moderate |
| 2 | Lift drill head up 1 metre or more | | | | |
| 3 | Check "o" rings in rod and blow down sub replace if necessary | | | | |
| 4 | Grease blow down threads and sit blow down in rod | | | | |
| 5 | Lower drill head and make up threads, do not over tighten | Personal injury – rotating rods | 22 High | Make sure safety cage is closed | 8 Moderate |
| 6 | Open main air valve to clear blockage<br>WARNING<br>**Make sure everyone is clear of deck and high pressure air areas before opening main air valve.**<br>**Open valve slowly.** | Personal injury – compressed air | 24 High | WARNING<br>**Do not use booster**<br>Inductions and training of no go areas.<br>Signage in place.<br>Keep clear of rotating parts<br>Make sure everyone is clear | 8 Moderate |
| 7 | WARNING<br>**Always bleed down air pressure before unscrewing blow down sub** | Personal injury — compressed air.<br>Air hose may kick | 24 High | Bleed off air pressure<br>Open air valve slowly | 8 Moderate |
| 8 | Remove sub, make up rods remove rod spanner and recommence drilling | Personal injury — crushed hands if rod falls | 23 High | Always hold blow down sub by the sides | 7 Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.14** **Prepared By: Vaughan Cullen**

**Title: Safe Handling – Blow Back Subs** **Approved By: Vaughan Cullen**

**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Insert rod spammer and unscrew rod on rotation spindle at slips table | Personal injury – hands | 21 High | Keep hands clear at all times | 7 Moderate |
| 2 | Lift drill head up a metre or so | | | | |
| 3 | Check "o" rings and replace if necessary | | | | |
| 4 | Grease threads then screw blow back sub onto rod/spindle holding it by the sides only | Personal injury – crushed hands if rod falls | 21 High | Hold blow back sub by the sides<br>PPE gloves<br>Inductions and training of no go areas.<br>Signage in place.<br>Keep clear of rotating parts | 7 Moderate |
| 5 | Lower head until blow back sub sits on rod in slips | | | | |
| 6 | Open main air valve to clear blockage<br>WARNING<br>**Make sure everyone is clear of deck and high pressure air areas before opening main air valve.**<br>**Open valve slowly.** | Compressed air – sample hose exploding – kicking.<br>Personal injury | 24 High | WARNING<br>**Do not use booster**<br>Inductions and training of no go areas.<br>Signage in place.<br>Keep clear of rotating parts<br>Make sure everyone is clear | 8 Moderate |
| 7 | WARNING<br>**Always bleed down air pressure before unscrewing blow down sub** | | | | |
| 8 | Unscrew blow back sub, holding it by the sides and remove | Personal injury – crushed hands | 23 High | Always hold blow down sub by the sides | 7 Moderate |
| 9 | Reconnect rod line, remove rod spanner and recommence drilling. | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.15** **Prepared By: Vaughan Cullen**
**Title: Remove and Assemble High Pressure Hoses** **Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Make sure sample hose fitting is at chest height when undoing.<br>If not position your shoulder underneath hose to find easiest unscrewing point.<br>WARNING<br>**HIGH PRESSURE AIR CAN RESULT IN SERIOUS INJURY OR EVEN DEATH.** | Hold heavy sample hose/hoses<br>Pressure not released.<br>Personal injury | 21<br>High | Safe manual handling procedures<br>SWP SURGEN 1.02 Manual Handling<br>Ensure pressure is released from hoses(ask DRILLER) | 7<br>Moderate |
| 2 | Loosen fitting with Stilson or hammer | Personal injury – hands | 20<br>High | Correct use of hand tools<br>Wear personal protective equipment (gloves)<br>SWP SURGEN 2.19 Stilson Use | 4<br>Low |
| 3 | With one person holding the weight of the hose, the other person may now undo the fitting completely | Personal injury – hands | 20<br>High | \Wear gloves<br>Safe manual handling procedures<br>SWP SLJRGEN 1.02 Manual Handling<br>Ensure pressure is released from hose (ask DRILLER) S | 7<br>Moderate |
| 4 | With one person still holding the hose the other person can now undo the "D" shackles holding the sock. | Personal injury – hands | 20<br>High | Correct use of hand tools<br>Teamwork<br>Communication<br>Gloves | 7<br>Moderate |
| 5 | Both persons can now lower the hose to the ground | Personal injury – back | 20<br>High | Safe manual handling procedures | 7<br>Moderate |
| 6 | To assemble hose work in a reverse order to this SWP.<br>Ensure fittings are secured and socks and "D“ shackles are fitted securely | | 20<br>High | Pre-start inspections<br>Right tool for the job<br>Check hoses are tagged and serviceable | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.16** **Prepared By: Vaughan Cullen**

**Title: Unblock RC Hose** **Approved By: Vaughan Cullen**

**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Shut down rig and all ancillary equipment | Personal injury. | 22<br>High | Ensure that all the air has been bleed out of all hoses.<br>IE: Open air vent tap and drain tap at bottom underside of control panel.<br>Gloves, eye and ear protection.<br>Signage and Inductions have been carried out.<br>Follow isolation procedures<br>SWP SURAIR 3.01 Compressor Safety<br>SWP SURAIR 3.02 Compressor Start up<br>SWP SURHSE 1.07 Isolate Compressor<br>SWP SURHSE 1.05 Isolate Drill Rig | 4<br>Low |
| 2 | Isolate machine and remove sample hose | Personal injury. | 8<br>Moderate | Follow isolate procedure<br>SWP SURAIR 3.15 Remove/Assemble High Pressure Hoses | 3<br>Low |
| 3 | Remove hose from rig and cyclone | Personal injury. Manual handling. | 8<br>Moderate | Correct manual handling | 3<br>Low |
| 4 | Lay hose flat on—the ground & secure hose to a star picket or other secure anchor point | Personal injury. Manual handling. | 8<br>Moderate | Correct manual handling | 3<br>Low |
| 5 | If portable pump is not available, use bean pump on rig | | | | |
| 6 | Remove danger tag from rig. Follow standard start up procedure | Personal injury. Equipment damage. | 22<br>high | Ensure all controls are in neutral, air valves closed and vents open. | 5<br>Low |
| 7 | Use bean pump and wash down hose to clear blockage. | Personal injury. | 8<br>Moderate | Place wash down hose inside sample hose and advance it to clear the blockage use minimum water pressure. | 3<br>Low |
| 8 | Reattach hose to rig | Personal injury. Manual handling. | 18<br>Moderate | Ensure all safety restraints are secured to the anchor points. | 5<br>Low |
| 9 | Circulate low pressure air through sample hose to remove any residual moisture from hose. | Personal injury. | 4<br>Low | Within one hour stop drilling and re tighten all the hose and anchor point fittings.<br>SWP SURAIR 3.15 Remove/Assemble High Pressure Hoses<br>Ensure fittings are tight and secure<br>Ensure socks are in place and "D" shackles secured | 1<br>Low |
| 10 | Return to normal drilling | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.17**
**Title: Preventative Maintenance Procedure for Hoses**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Revision Date: 8th Oct. 2010 Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Tag out and isolate equipment | Personal injury working on live equipment | 24 High | Compliance with company and client tag out isolation procedures SWP SURHSE 1.05 isolation Lockout | 3 Low |
| | **VISUAL INSPECTION** | | | | |
| 1 | Any Internal Wear through Internal cover, to Hose Reinforcing | Weakening Manual Handling | 22 High | Wear gloves and safety glasses | 7 Moderate |
| 2 | Hose damage by being squashed or run over by a vehicle | Weakening Manual Handling | 24 High | Make sure hose are out of the way SURHSE1.03 Housekeeping Work Area / SURHSE 1.04 Housekeeping Tools | 7 Moderate |
| 3 | Hose being excessively stretched | Weakening Manual Handling | 24 High | Make sure hose is correct size and length | 7 Moderate |
| 4 | CAUTION Any damage to hose surface that can weaken its structure.<br>WARNING<br>**Damaged hoses Should Be Discarded Immediately** | Weakening Manual Handling | 24 High | Wear gloves and safety glasses<br>Conduct Pre-start inspections<br>Order new hoses before the current ones get to this stage. | 7 Moderate |
| 5 | **Stainless Steel hose Socks to be used** | | | | |
| 6 | All hose Socks to be restrained by rated shackles and Herc alloy chain. | Personal injury | 25 High | Wear PPE, use correct tools | 2 Low |
| 7 | Restraint Anchors as per ISAS/BHP recommendations | | | | |
| 8 | Heavy Duty Tails and nuts with Heavy Duty Boss clamp to be used (4" Hose 3 piece clam 3" Hose 2 piece clamp) | Correct fitting | 23 High | Use of correct tools | 8 Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURAIR3.17**
**Title: Preventative Maintenance**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 9 | WARNING<br>**Damaged hoses Should Be Discarded Immediately** | Not to specification | 23<br>high | Use of correct tools | |
| 10 | Tails and nuts are not to be fitted to internally worn hose | | | | |
| 11 | **Oil must not be used** to assemble Tail and Nut to Hose, use soapy water. | | | Refer to SWP SURAIR 3.15 Remove and assemble Hoses<br>SWP MAINGEN 9.16 Prevent Hose Maintenance | |
| 12 | Rotate sample Hose to Expose new liner section to increase hose life, bends are where most wear will occur.<br>WARNING<br>**When transporting do not kink or bend hose as it weakens the structure.** | | | | |

# NOTE: Ensure the correct couplings are used at all times

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.18**
**Title: RC Hose Fittings**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Gather all the parts and tools to complete the job. | Personal Injury. Manual handling | 4 Low | Check with Driller and/or Supervisor that you have all the correct parts. Inspect hose and/or hose stem/tail for wear, abrasions or internal wear. If hose is worn replace hose (if worn at end of hose only, remove worn section and remake hose fittings). | 1 Low |
| 2 | Unroll the new hose and fit safety hose socks. | Personal Injury. Manual handling | 4 Low | | 1 Low |
| 3 | Assemble hose tail, collar and hammer lock nut | Personal Injury. Manual handling. Hand tools | 4 Low | Assemble hose tail, collar and hammer lock nut by referring to drawing provided with parts.<br>Push hose tail assemblies into the end of hose (This must go into the hose, right up to the collar).<br>PPE: Gloves eye and ear protection | 1 Low |
| 4 | Fit boss clamp. | Personal Injury. Manual handling. Hand tools | 4 Low | Place the two pieces of the boss clamp either side of the hose with the lugs inserted into the groove on the hose tail collar. Ensure that retaining lug on each half of the hose clamp is fully inserted into the locking groove and hard up against the load shoulder of the groove. | 1 Low |
| 5 | Tighten bolts | Personal Injury. Manual handling. Hand tools | 4 Low | Tighten bolts up evenly with 1 1/8" spanner. Use 200FT LBS Torque on these bolts to lock the hose firmly onto the hose tail assembly. Ensure there is no gap between the outside of the hose and the inside diameter of the clamps.<br>SWP SURHSE 1.02 Manual handling | 1 Low |
| 6 | Check bolts. | Personal Injury. Manual handling. Hand tools | 4 Low | WARNING<br>**Check the 4 bolts after one full day of service.**<br>**Supervisors to check all hoses once assembled.** | 1 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.19** **Prepared By: Vaughan Cullen**

**Title: Cleaning Dust Suppression Unit** **Approved By: Vaughan Cullen**

**Revision Date: 8th Oct. 2010** **Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Dust suppression unit must be firstly cleaned (de-contaminated) in the AMWD yard before going to drill site. | Contamination of sample at new site | 17 Moderate | Ensure unit is cleaned before use. | |
| 2 | If the dust suppression unit number requires cleaning and unblocking on drill site, the steps below must be followed | | | | |
| 3 | All required PPE must be worn | | | | |
| 4 | All air pressure must be release and the drill rig to be isolated | Pressure to be released before unhooking hoses.<br>Personal injury struck by | 17 Moderate | Isolation — check if rig will start after isolation | 5 Low |
| 5 | If dust suppression unit is on an unlevel, uneven section of ground, then it must be moved before attempting any work on it | | | | |
| 6 | If the dust suppression unit is on level, even ground then go to step 9 | | | | |
| 7 | All hoses to be undone from either the drill rig or the suppression unit | Pinch points, splinters form socks or noses | 17 Moderate | PPE and good communication<br>PPE if hoses or socks are damaged in such a way, they will need replacing | 5 Low |
| 8 | Dust suppression unit must then be moved to a clear flat, safe area | Ensuring people are clear | 17 Moderate | Communicating and visual contact | |
| 9 | Personnel must place a set of steps in the area in front of the dust suppressor before attempting work. | Manual handling | 17 Moderate | Apply correct manual handling techniques | 7 Moderate |
| 10 | Never work off the side without steps in place | | | | |
| 11 | When working at heights personnel must at all times keep good footing | Falling backwards | 20 Moderate | Good footing three point contact at all times. Two hands & one foot or Two feet one hand. | 8 Moderate |
| 12 | Removing of dust filters | Dusty conditions | 17 Moderate | Wear appropriate PPE Dust masks | 4 Low |
| 13 | Replacing dust filters | Dusty conditions | 17 Moderate | Wear appropriate PPE Dust masks | 4 Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURAIR3.19**
**Title: Cleaning Dust Suppression Unit**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 14 | When unit is cleaned, then the dust suppressor can be either hooked up or moved back into its place | | | | |
| 15 | Ensure when doing up all hoses and socks to double check that they are all done up tight | Pinch points. Splitters from sock or hoses | 17 Moderate | PPE and good communication<br>PPE if hoses and socks are damaged in any way, they will be replaced. | 4 Low |
| 16 | Keep clear when air pressure is initially turned on. | Flying objects if things are loose | 17 Moderate | Keep good distance until safe to proceed | 4 Low |
| 17 | Re-check all fittings after 15 rods have been drilled | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.20**
**Title: Drillclean Dust Collection Maintenance**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | The machine consists of 2 cyclones and a filter box mounted on a tandem axle trailer | | | | |
| 2 | On units with a moveable cyclone, the cyclone must be lowered before moving the trailer. | Trailer instability/overturning—keep clear when lowering. | 21 High | Lower cyclone fully before towing. | 8 Moderate |
| 3 | On units with a moveable cyclone; a safety prop should be fitted under the support arm in case of lifting jack failure. | Injury from cyclone dropping unexpectedly. | 21 High | Ensure prop is in place after cyclone is raised. | 8 Moderate |
| 4 | One cyclone is connected to the top swivel to collect sample in the usual way, the other cyclone is connected to a tee piece at the hole collar, to collect material normally blown out around the rods | | | | |
| 5 | The fine dust which would normally be blown from the top of the cyclones is ducted in to the filter box. Dust laden air passes through the filter elements where the dust is retained, the clean air being exhausted to atmosphere | | | | |
| 6 | The filters are continuously and automatically cleaned by a system that releases a blast of air in reverse through each filter in sequence. The reverse flow dislodges the dust which then falls into the hopper and collection bag | | | | |
| 7 | The sample hose and vent hose (from hole collar) are connected to the cyclones and hose restraints are secured | Compressed air - sample hose kicking | 22 High | Ensure nose restraints are secured | 7 Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.20**
**Title: Drillclean Dust Collection Maintenance**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 8 | The front and rear gates of the trailer are opened to allow bag access | | | | |
| 9 | The service line is connected to the compressor outlet | | | | |
| 10 | The operating pressure range is from 7 to 28 bar (100 to 400 PSI). A suitable regulator must be fitted to compressor | 0 — 900 PSI Air Volume up to 2000 CFM | 25 High | Hearing protection must be worn. | 12 Moderate |
| 11 | Always connect the service line to the compressor- NEVER THE BOOSTER OUTLET | Compressed air — sample hose exploding — kicking. Personal injury | 25 High | Make sure hose is fitted correctly and securely | 12 Moderate |
| 12 | To change sample bag, close the butterfly valve between bag changes to prevent dust escape. | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.21**
**Title: Running Tubex Casing Using SOS Hammer & R/C Rods**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Back truck adjacent to rig walk way (Rod Box) with 2m overhanging | | 7 Low | HR truck license | 2 Low |
| 2 | Set up rod guide | | | | |
| 3 | Slide 3 ½ " rod into casing | | 7 Moderate | Safe Manual Handling<br>SWP SURHSE 1.02 Manual Handling<br>P.P.E. gloves and eye protection | 2 Low |
| 4 | Screw saver sub into rod (grease) | | 7 Moderate | Safe Manual Handling<br>SWP SURHSE 1.02 Manual Handling<br>P.P.E. gloves and eye protection | 2 Low |
| 5 | Grease male thread of casing | | | | |
| 6 | Screw manifold into casing | | 7 Moderate | Safe Manual Handling<br>SWP SURHSE 1.02 Manual Handling<br>P.P.E. gloves and eye protection | 2 Low |
| 7 | Fit pipewiper and manifold over top of RC rod | | 7 Moderate | Safe Manual Handling<br>SWP SURHSE 1.02 Manual Handling<br>P.P.E. gloves and eye protection | 2 Low |
| 8 | Bolt top to manifold | | 7 Moderate | Gloves<br>Correct use of hand tools | 2 Low |
| 9 | Fit anvil slings and cables to casing | Personal Injury | 20 Moderate | WARNING<br>**Ensure lifting gear is tagged and in a serviceable condition**<br>**Ensure lifting gear is rated to the task.**<br>**P.P.E. gloves and eye protection.**<br>**Ensure safety ropes and bars are attached along the side of truck.**<br>**Work on an even surface**<br>**Maintain good communication with crew.**<br>**Ensure smooth lever operation**<br>Safe Manual Handling<br>SWP SURHSE 1.02 Manual Handling | 7 Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.21**
**Title: Running Tubex Casing Using SOS Hammer & R/C Rods**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 10 | Screw dixon boss hose end to manifold end secure safety line | | | | |
| 11 | Attach winch to a shackle on slings and cables | | 13 Moderate | Pre—start inspections on lifting equipment<br>Check all fittings are secure<br>Ensure lifting gear is tagged and in a serviceable condition<br>Ensure lifting gear is rated to the task.<br>Gloves | 7 Moderate |
| 12 | Winch into position (offsider to hold anvil and guide casing) | | 13 Moderate | Gloves<br>Never stand in line with rod.<br>Pre—start inspections on lifting equipment<br>Check all fittings are secure<br>Ensure lifting gear is tagged and in a serviceable condition<br>Ensure lifting gear is rated to the task. | 7 Moderate |
| 13 | Screw head into RC rod | | 13 Moderate | WARNING<br>**Slowly engage forward rotation to do up thread** | 7 Moderate |
| 14 | Lower casing to sit on sups table | | | | |
| 15 | Remove slings and chains from casing and winch | | | | |
| 16 | Attach winch to casing lifter | | | | |
| 17 | Wrap casing litter around casing clamp and tighten with l8" shifter | Personal Injury (hands) | 13 Moderate | SWP SURHSE1.02 Manual Handling<br>PPE gloves and eye protection<br>Correct use of hand tools. | 7 Moderate |
| 18 | Lift casing so pin end of RC rod protrudes | | | WARNING<br>**Ensure lifting gear is tagged and in a serviceable condition**<br>**Ensure lifting gear is rated to the task** | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.21**
**Title: Running Tubex Casing Using SOS Hammer & R/C Rods**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | | | | **P.P.E. gloves and eye protection.**<br>**Ensure safety ropes and bars are attached along the side of truck.**<br>**Work on an even surface**<br>**Maintain good communication with crew.**<br>**Ensure smooth lever operation**<br>Safe Manual Handling<br>SWP SURHSE 1.02 Manual Handling | |
| 19 | Remove anvil | | 13<br>Moderate | SWP SURHSE 1.02 Manual Handling<br>PPE. gloves and eye protection<br>Correct use of hand tools. | |
| 20 | Lower RC rod and makeup tool joint | | 13<br>Moderate | SWP SURHSE1.02 Manual Handling<br>SWP SURGEN 2.19 Stilson Use<br>P.P.E. gloves and eye protection<br>Correct use of hand tools.<br>Maintain balance and ensure good grip on rod | 7<br>Moderate |
| 21 | Lower casing over pin end of casing | | 13<br>Moderate | WARNING<br>**Ensure lifting gear is tagged and in a serviceable condition**<br>**Ensure lifting gear is rated to the task.**<br>**P.P.E. gloves and eye protection.**<br>**Work on an even surface**<br>**Maintain good communication with crew.** | 7<br>Moderate |
| 22 | Make up with 48" chain tongs | Personal Injury | 13<br>Moderate | Ensure smooth lever operation<br>SWP SURHSE 1.02 Manual Handling<br>P.P.E. gloves and eye protection<br>Correct use of hand tools.<br>Maintain balance and ensure good grip on rod | 7<br>Moderate |
| 23 | Recommence drilling | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.22**
**Title: Pulling Tubex Casing**
**Revision Date: 8th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Pull back head | | | | |
| 2 | Rack head across | | | | |
| 3 | Screw 10k pulling plug to left hand cap | Lifting, Personal Injury | 13 Moderate | Safe Manual Handling<br>SVVP SURHSE 1.02 Manual Handling<br>Train and assess employees to this work instruction. | |
| 4 | Tighten with stilsons | Lifting, Personal Injury | 13 Moderate | Safe Manual Handling<br>SVVP SURHSE 1.02 Manual Handling<br>Ensure stilson is clean jaws are sharp right size for the job and visually inspect the spring is in good condition.<br>Have 3mm —5mm gap between hook jaw & drill rod.<br>SWP SURGEN 2.19 Stilson Use<br>Wear gloves.<br>Train employees to this work instruction. | 7 Moderate |
| 5 | Attach pulling plug to winch | | | | |
| 6 | Lower onto casing and screw left hand tight using chain tongs on cad | Lifting, Personal Injury | 13 Moderate | Safe Manual Handling<br>Train employees to this work instruction | |
| 7 | Pull back stead to next 6m tool joint | | | | |
| 8 | Clamp casing in foot clamps enough to hold not dent. | | | | |
| 9 | Relax Winch | | | | |
| 10 | Check foot clamps holding casing | | | | |
| 11 | Back up 48" stilsons under sups table to drillers side jack leg | Lifting, Personal Injury | 13 Moderate | Safe Manual Handling<br>SWP SURHSE 1.02 Manual Handling<br>WARNING<br>**Ensure good communication and look at positioning of stilsons and hands/fingers before engaging in breaking of thread.**<br>P.P.E. gloves and eye protection.<br>Train employees to this work instruction | |
| 12 | Using 48" chain tongs unscrew left hand thread towards drillers control panel. | Lifting, Personal Injury | 13 Moderate | Safe Manual Handling<br>SWP SURHSE 1.02 Manual Handling<br>Train and assess employees to this work instruction | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.22**
**Title: Pulling Tubex Casing**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | | | | Ensure good communication and look at positioning of stilsons and hands/fingers before engaging in breaking of thread.<br>P.P.E. gloves and eye protection. | |
| 13 | Take up weight on winch — lift casing | | | | |
| 14 | Tie Rope 0.5m from bottom | | | Ensure rope and lifting gear is secure | |
| 15 | Offsider uses rope to pull casing onto truck deck | | 13<br>Moderate | WARNING<br>**Ensure lifting gear is tagged and in a serviceable condition**<br>**Ensure lifting gear is rated to the task.**<br>**P.P.E. gloves and eye protection.**<br>**Ensure rod sloop is as low to the ground as possible**<br>**Ensure safety ropes and bars are attached along the side of truck.**<br>**Work on an even surface**<br>**Maintain good communication with crew.**<br>**Ensure smooth lever operation** | |
| 16 | Driller lower winch — casing slides down rod guide pulls offsider pulls casing onto the truck | | 13<br>Moderate | Ensure lifting gear is tagged and in a serviceable condition<br>Ensure lifting gear is rated to the task.<br>P.P.E. gloves and eye protection.<br>Ensure rod sloop is as low to the ground as possible<br>Ensure safety ropes and bars are attached along the side of truck.<br>Work on an even surface<br>Maintain good communication with crew.<br>Ensure smooth lever operation | 4<br>Low |
| 17 | Undo Rope | | | | |
| 18 | Using chain tongs to hold casing undo pulling plug with stilsons | Casing drops | 13<br>Moderate | Ensure lifting gear is tagged and in a serviceable condition<br>Ensure lifting gear is rated to the task.<br>P.P.E. gloves and eye protection.<br>Ensure rod sloop is as low to the ground as possible<br>Ensure safety ropes and bars are attached along the side of | 4<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

## STANDARD WORK PROCEDURE

**No: SURAIR3.22**
**Title: Pulling Tubex Casing**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | | | | truck.<br>Work on an even surface<br>Maintain good communication with crew.<br>Ensure smooth lever operation<br>Ensure chain tongs are secure on casing<br>Use dog clamps | |
| 19 | Repeat steps 5 to 18 until all casing is out | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.23**
**Title: Injecting Mist or Foam**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Ensure water pump suction hose is minimum 2 inches ID | | | Pre-start inspection | |
| 2 | Ensure vent on control panel is closed | Foam or water will not flow down hole | 18 Moderate | Close vent | 4 Low |
| 3 | Turn water valve off | | | | |
| 4 | Close the air delivery line drain valve at bottom of control panel | | | | |
| 5 | Mix foam in mixing tank if necessary | Foam splash from container when mixing – eye injury | 12 Moderate | Wear protective glasses<br>Correct manual handling | 7 Moderate |
| 6 | Air valve must be on while compressor is running | | | | |
| 7 | Engage water pump with compressor running | | | | |
| 8 | Direct the exhaust hose of the pressure relief valve into the mixing tank | | | | |
| 9 | Set water pump flow setting to 300 RPM or 33lpm with water pump fine control valve | | | | |
| 10 | Make sure the relief valve is set at a minimum of 50 PSI higher than the maximum compressor air pressure | | | | |
| 11 | Open the water mist injection tap to inject the desired amount of water or foam into the air system | | | | |
| 12 | Any excess water flow will now be flowing across the water pressure relief valve back into the mixing tank | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.24**
**Title: Back Hammer**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Prepare to fit back hammer. | Personal injury Sprains and strains. | 21 high | Appraise the job before commencing the task.<br>Use mechanical means for heavy lifting or use two people<br>Communicate with the crew and carry out a careful analysis of the task before commencement.<br>Pre-Start inspections<br>Lifting gear tagged and in serviceable condition.<br>cables in good condition, cable clamps fitted correctly, hook is not badly worn or cracked<br>Hauling plug and subs are in serviceable condition. | |
| 2 | Check barricades and signage | Personal injury entering an unauthorised and dangerous area.<br>Struck or caught by rotating rods | 20 High | Ensure the area is barricaded off with a fence and signage before starting to lower rods.<br>Conduct inductions on no go areas | 5 Moderate |
| 3 | Rod make up | Equipment damage. Rods back off in the hole. | 13 Moderate | All rods to be torque up to 10,000 Ft lb Lower to break through and hold rod string in clamps | 8 Moderate |
| 4 | Position back hammer. | Personal injury. Lifting. Sprains and strains | 21 High | Inductions<br>Site to be inspected by authorised personnel and hazards identified and controlled before commencing task of positioning hammer under rod string by competent persons<br>Position hammer directly under rod string, | 5 Moderate |
| 5 | Make up rods to hammer | Personal injury. Crush | 13 Moderate | At no time shall any body part come between the moving drill string and any stationary object. Lower rod string and make up to hammer 5000 ft lb. | 8 Moderate |
| 6 | Fit make up spanners & torque hammer to drill string | Personal injury. Lifting, Sprains and strains | 8 Moderate | Correct manual handling. Torque hammer to drill string 10000 ft lb<br>PPE: GLOVES | 3 Low |
| 7 | Unclamp hammer & remove bench | Personal injury. Lifting, Sprains and strains | 8 Moderate | Reposition barricades and signage | |
| 8 | Start back hammer operations | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURAIR3.25**
**Title: Splitting Samples**
**Date: 11th April. 2011**

**Prepared By: Lawrie Lorrigan**
**Approved By: Vaughan Cullen**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Collect sample in bag under cyclone | | | Use correct PPE. Dust masks to be used if required | Low |
| 2 | Remove sample bag from cyclone | Personal injury. Lifting. Sprains and strains | High | Correct manual handling. Refer to **SWP SURHSE1.02 Manual Handling** | Moderate |
| 3 | Carry sample bag to splitter | Personal injury. Lifting. Sprains and strains Slips and trips | High | Correct manual handling. Refer to **SWP SURHSE1.02 Manual Handling** Clear area of loose rocks. Keep splitter close to cyclone to avoid carrying sample too far | Moderate |
| 4 | Lift sample bag up and tip into hopper | Personal injury. Lifting. Sprains and strains | High | Correct manual handling. Refer to **SWP SURHSE1.02 Manual Handling.**<br>**Please Note: For heavy samples**. If sample bag is heavy, consider the following options.1/ Use an intermediate lifting stage such as a tyre or a low stand, and then lift from that point into the hopper.<br>2/ Consult with site geologist about taking ½ metre sample, when drilling particularly heavy sample such as iron ore. | Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURMUD4.01**
**Title: Rotary Mud Collar and Install Blooie Line And Diverter**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Make up rod to rotation head | Pinch points crush injuries.<br>Strain sprains. | 18<br>Moderate | Correct PPE<br>SWP SURHSE 1.01 PPE<br>Correct use of stilson's SWP SURGEN 2.19 Stilson Use<br>Correct manual handling SWP SURHSE 1.02 Manual Handling<br>Refer to SWP SURDIA 5.17 Add/Remove Rod Clamshell.<br>At no time shall any body part come between Kelly rod and mast or rotation head. | 7<br>Moderate |
| 2 | Make up starter barrel / tri cone to rod | Pinch points crush injuries.<br>Strain sprains.<br>Rotating equipment. | 21<br>High | Correct PPE<br>Correct use of stilton's<br>Correct manual handling.<br>At no time shall any body part come between Kelly rod and mast or rotation head.<br>SWP SURGEN 2.19 Stilson Use Steps 11 and 12.<br>Ensure Stilson is clean jaws are sharp right size for the job and visually inspect the spring is in good condition.<br>Wear gloves. i<br>Have 3mm ~5mm gap between hook jaw & drill rod. l<br>Use smaller stilsons once joint is broken and thread loose<br>Use one hand on back of hook to make sure it grips.<br>WARNING<br>**NEVER STAND ON STILSONS OR BE SUPPORTED WHILST CONDUCTING THIS PRACTICE.**<br>Ensure good housekeeping<br>Train and assess to this standard | 7<br>Moderate |
| 3 | Start circulating mud | Equipment damage. | 4<br>Low | Check swivel for free rotation- grease while rotating by hand<br>Check pressure relief valve set at 600 psi.<br>Check mud tank level and viscosity | 1<br>Low |

## STANDARD WORK PROCEDURE

| STEP | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| | | | | SWP SURGEN 2.17 Mix Mud<br>SWP SURGEN 2.18 Using A Marsh Funnel<br>Set torque limiter. | |
| 4 | Rotate drill rod<br>Balance Rods and start drilling | Rotating equipment. Slip / trip. | 22<br>High | Keep clear of rotating parts. Ensure spin guard is in place.<br>Ensure adequate drainage.<br>Refer to operator's manual for specific rig to adjust holdback. | 4 |
| 5 | Drill to casing depth. | Incorrect Measuring | 8<br>Moderate | Recheck depth for casing | 2<br>Low |
| 6 | Trip out drill string | Manual handling sprains and strains rod handling. | 8<br>Moderate | Compliance with Pulling rods.<br>Correct PPE<br>Correct use of stilson's SWP SURGEN 2.19 Stilson Use<br>Correct manual handling SWP SURHSE 1.02 Manual Handling.<br>Refer to SWP SURDIA 5.17 Add/Remove Rod Clamshell.<br>At no time shall any body part come between Kelly rod and mast or rotation head. | 3<br>Low |
| 7 | Place casing. | Manual handling sprains and strains rod handling. | 8<br>Moderate | Compliance with<br>Manual Handling<br>Correct PPE<br>Correct use of stilson's SWP SURGEN 2.19 Stilson Use<br>Correct manual handling SWP SURHSE 1.02 Manual Handling.<br>Refer to SWP SURDIA 5.17 Add/Remove Rod Clamshell.<br>At no time shall any body part come between rod and mast or rotation head. | 3<br>Low |
| 8 | Cement in place | Personal injury cement burns. | 8<br>Moderate | Wear correct PPE Gloves Safety Dust Mask.<br>Read MSDS on chemical being used.<br>First aid Kits<br>Refer to SWP on manual handling<br>As a guide 2 kg cement and 1 lt of water will produce 1.55 lts of cement slurry.<br>Mix and circulate cement | 3<br>Low |
| 9 | **If Gas Drilling**<br>Install blooie line, diverter and Washington rubber. | Personal injury<br>Gas kick explosion | 22<br>High | Pre—start inspections<br>Correct manual handling SWP SURHSE 102 Manual Handling.<br>Refer to SWP Hiab Operation<br>Competent operators<br>Ensure tagging and serviceable lifting gear<br>Use correct tool for the job<br>Induct crew on risk of gas explosion | |

## STANDARD WORK PROCEDURE

| STEP | SPECIFIC JOB STEPS | HAZARDS WITHIN THIS STEP (Safety and Environmental) | RISK LEVEL SCORE | HAZARD CONTROL ACTIVITY REQUIRED | RESIDUAL RISK SCORE |
|---|---|---|---|---|---|
| | | | | Signage<br>No ignition sources with in 10 meters of the collar<br>Follow emergency evacuation procedures<br>SWP COALGEN 13.04 Gas Leak | |
| 10 | **If Gas Drilling**<br>Drill on with PCD bit using water/fluid.<br>Hole to be full of water at all times.<br>Whether pulling putting or drilling.<br>Hole to be full of fluid. | Gas blow back. Persona injury equipment damage. | 12<br>Moderate | Ensure the hole is kept full of fluids at all times when pulling and running rods.<br>Use a gas monitor<br>Use signage<br>Induct crew and visitors on the risk of gas explosion. | 5<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURMUD4.02**
**Title: Grouting Aquifer and Plug Hole**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Screw SSGP sub set grout packer on to rod string | Personal injury hand tools<br>Manual handling | 17<br>Significant | Correct use of hand tools<br>Correct manual handling<br>SWP SURGEN 2.19 Stilson Use.<br>Ensure stilson is clean jaws are sharp right size for the job and visually inspect the spring is in good condition.<br>Wear gloves.<br>Have 3mm -5mm gap between hook, jaw & drill rod.<br>Use smaller stilsons once join is broken and thread loose<br>Use one hand on back of hook to make sure it grips.<br>Gloves to be worn | 3<br>Low |
| 2 | Run drill rods to desired depth above Aquifer | Personal injury rotating rods.<br>Make sure all personnel are.<br>Clear before activating equip. | 23<br>High | Correct manual handling<br>Train on this work instruction<br>Refer to SWP SURDIA 5.11 Pull/Run Rods<br>SWP SURDIA 5.17 Add/Remove Rods Clamshell<br>SWP SURHSE 1.02 Manual Handling. | 12<br>Moderate |
| 3 | Lock packer into piece by pulling back on rod string | | | | |
| 4 | Mix cement | Personal injury cement burns | 17<br>Significant | Wear correct PPE Gloves Safety Dust Mask.<br>Read MSDS on chemical being used.<br>Refer to SWP on manual handling<br>As a guide 2 kg cement and 1 lt of water will produce 1.65 lts of cement slurry.<br>Mix and circulate cement. | 8<br>Moderate |
| 5 | Pour desired amount of cement into rod string | Personal injury cement burns | 17<br>Significant | Wear appropriate PPE<br>Volume hole = .785 x diameter$^2$ x depth | 8<br>Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURMUD4.02**
**Title: Grouting Aquifer and Plug Hole**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 6 | Adjust pressure relief valve to desired pumping pressure<br>Calculate displacement | Personal injury hand tools | 17<br>Significant | Correct manual handling | 8<br>Moderate |
| 7 | Start up water pump | | | | |
| 8 | Pump cement until pressure relief valve blows off and correct amount of water is displaced. | | | | |
| 9 | Shut off pump | | | | |
| 10 | Unscrew setting sub from packer. By turning rod string clock wise. | Personal injury | 15<br>Significant | Correct use of hand tools | 8<br>Moderate |
| 11 | Pull rods back slowly with head.<br>Water pump set at 15 lt/minute and on.<br>Until cement has been displaced back to required depth.<br>Pull back at least 100 metres above cemented zone with vented hauling plug.<br>Circulate again. | Personal injury lifting<br>Cement in string | 23<br>High | Refer to SWP SURDIA 5.11 Pull/Run Rods<br>SWP SURDIA 5.17 Add/Remove Rods Clamshell<br>SWP SURHSE1.02 Manual Handling.<br>Run derby/rubber plug to clean out cement him inside rod string.<br>Should feel rods sucking and water displacing when haul plug is used. | 13<br>Moderate |
| 12 | Wait on cement to set | | | | |
| 13 | Wash all tools and work area thoroughly after cementing. | | | SWP SURHSE 1.04 Housekeeping tools.<br>Ensure cementing pumps are thoroughly cleaned. | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURMUD4.03**
**Title: Pump Van Ruth and Grout Hole**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Run rods into required depth and Pump down Van Ruth plug | Personal injury | 17<br>Significant | Correct use of hand tools<br>Correct manual handling<br>SWP SURGEN 2.19 Stilson Use.<br>SWP SURDIR 5.11 Pull/Run Rods Hoist Plug<br>SWP SURDlR 5.17 Pull/Run Rods Clamshell<br>Ensure stilson is clean jaws are sharp right size for the job and visually inspect the spring is in good condition.<br>Wear gloves.<br>Use smaller stilsons once join is broken and thread loose<br>Gloves to be worn<br>Pump Van Ruth down through rod string at 40 lts/min until it blows off. | 3<br>Low |
| 2 | Van Ruth seats.<br>Pull back until pressure releases.<br>G0 back down slowly to feel Van Ruth in position.<br>Mark rod with pen<br>Pullback enough to release pressure | Drag van Ruth<br>Pull back too far<br>\/an Ruth not sealed. | 10<br>Moderate | Pullback slowly after feeling van Ruth until pressure stops.<br>Would be about 50mm (enough so rubber plug hits van Ruth with out falling out of rod string.)<br>If van Ruth drags up hole shake it out or consider running overshot down to knock it out, without sending overshot outside the rod string.<br>Consult supervisor | 3<br>Low |
| 3 | Pull back enough rods to enable all the required cement to be pumped.<br>Insert first rubber plug | Wrong calculations | 10<br>Moderate | Calculate required amount of cement to plug hole on top of van Ruth.<br>Calculate id of rod string<br>Calculations that can be considered.<br>.785 x DlAM2(in meters) x depth(in metres)<br>lE: Volume ot100mm hole, 1mtrs deep<br>= .785x.1x.1x1<br>= .00785 mtrs cube<br>Volume ltrs = .00785 x 1000<br>= 7.85 lts per metre i | |
| | | | | | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURMUD4.03**
**Title: Pump Van Ruth and Grout Hole**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 4 | Mix cement | Personal injury cement burns | 17 Significant | Wear correct PPE Gloves Safety Dust Mask.<br>Read MSDS on chemical being used.<br>First aid Kits<br>Refer to SWP on manual handling<br>As a guide 2 kg cement and 1 lt of water will produce 1.55<br>It's of cement slurry.<br>Mix and circulate cement | 8 Moderate |
| 5 | Pump desired amount of cement into rod string | Personal injury cement burns<br>Hose blows | 17 Significant | Wear appropriate PPE<br>Volume hole = .785 x diameter² x depth<br>WARNING<br>**Ensure use of vented cement head for this procedure other wise an air lock will occur.**<br>SWP SURAIR 3.15 Assemble/Remove High Pressure Hose | 8 Moderate |
| 6 | Place second rubber plug in rod string,<br>Clean out and flush pump, | Personal injury | 12 Significant | Wear correct PPE Gloves Safety Dust Mask.<br>Read MSDS on chemical being used.<br>Refer to SWP on manual handling | |
| 7 | Adjust pressure relief valve to desired pumping pressure<br>Calculate displacement | Personal injury hand tools | 17 Significant | ID Rod String =.785 x diameter² (in mtrs) x depth (in mtrs).<br>IE: Volume of 100mm hole, 1mtrs deep<br>=.785x.1x.1 x1<br>= .00785 mtrs cube<br>Volume ltrs = .00785 x 1000<br>= 7.85 lts per metre | 8 Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURMUD4.03**
**Title: Pump Van Ruth and Grout Hole**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 8 | Start up water pump | | | | |
| 9 | Pump cement until pressure relief valve blows / pressure increase off **and correct amount of water is displaced.** | | | | |
| 10 | Shut off pump | | | | |
| 11 | Pull rods back slowly with head.<br>Water pump set at 15 lt/minute and on.<br>Until cement has been displaced back to required depth<br>Pull out with vented hauling plug. | Personal injury lifting<br>Cement in string | 23<br>High | Refer to SWP SURDIA 5.11 Pull/Run Rods<br>SWP SURDIA 5.17 Add/Remove Rods Clamshell<br>SWP SURHSE 1.02 Manual Handling.<br>Should feel rods sucking and water displacing when haul plug is used. | 13<br>Moderate |
| 12 | Wait on cement to set | | | | |
| 13 | Wash all tools and work area thoroughly after cementing. | | | SWP SURHSE 1.04 Housekeeping tools.<br>Ensure cementing pumps are thoroughly cleaned. ’ | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURMUD4.04**
**Title: Annulus Grout Hole**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Measure casing, bump sub and or fibreglass casing.<br>Drill hole to required depth. | Miscalculations | 17<br>Significant | Induct crew and task to be performed.<br>Two people to measure casing and record on casing sheet.<br>Note any extra lengths of casing that are loaded on the truck or sloop.<br>SWP SURGEN 2.25 Calculate Hole Depth | 3<br>Low |
| 2 | Flush hole at end of hole depth and pull back 5 metres.<br>If cementing casing off bottom; eg; Vertical well a mud plug will need to be pumped down the hole to eliminate grouting the bottom of the hole before rods are pulled out | Equipment damage<br>Personal injury | 17<br>Significant | Correct use of hand tools<br>Correct manual handling<br>SURHSE 1.02 Manual Handling<br>SWP SURGEN 2.19 Stilson Use.<br>SWP SURDIR 5.11 Pull/Run Rods Hoist Plug<br>SWP SURDIR 5.17 Pull/Run Rods Clamshell<br>Gloves<br>Mud plug would consist of a brew similar to a mix to contain gases in an uncapped drill hole.<br>SWP SURHSE 1.19 Emergency Procedures gas blowout<br>Lithium gum 10 kg<br>Pac 5kg<br>Safe lube 1lts<br>Barites 35 kg ·<br>Per 1000lts<br>Or ·<br>Gel 10kg ·<br>Pac 5 kg<br>Liquipol 5 lts<br>Barites 35 kg<br>Per 1000lts<br>Or similar to obtain a heavy mud mix of SG1.6 to 1.8<br>SWP SURGEN 2.17 Mix Mud | 3<br>Low |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURMUD4.04**
**Title: Annulus Grout Hole**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 3 | Calculate annulus of hole | Miscalculations | 17<br>Significant | SWP SURGEN 2.25 Calculate Hole Depth<br>**Volume of Annulus= volume of hole minus Volume of rods.**<br>Volume=.785 x Diameter2(in mtrs) x Depth(mtrs)<br>IE: Volume of 100mm hole , 1rntrs deep<br>=.785x.1x.1x1<br>= .00785 mtrs cube<br>Volume ltrs = .00785 x 1000<br>= 7.85 its per metre<br>Calculate the same for the O.D. of the casing and subtract from the hole volume. | 3<br>Low |
| 4 | Run in casing.<br>Circulate casing to ensure no blockages and continue to circulate casing until cement is ready to be pumped down the hole, | Personal injury<br>Casing parts or drops | 24<br>High | **Count rods on truck and note any extra lengths.**<br>**Mark off each rod against casing sheet as it is ran down the hole**<br>Correct use of hand tools<br>Correct manual handling<br>SWP SUR GEN 2.19 Stilson Use.<br>SWP SURDlR 5.11 Pull/Run Rods Hoist Plug<br>SWR SURDlR 5.17 Pull/Run Rods Clamshell<br>SWR COALGEN 13.05 Run Casing With a Sling<br>Gloves<br>Ensure clean water is flushed through annulus<br>Consult supervisor if water returns are not evident. | 12<br>Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURMUD4.04**
**Title: Annulus Grout Hole**
**Revision Date: 11th Oct. 2010**

**Prepared By: Vaughan Cullen**
**Approved By: Vaughan Cullen**
**Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| | | | | | |
| 5 | Add casing short and set casing at required height.<br>Clamp casing in this position, | Personal injury | 12<br>Moderate | Wear correct PPE Gloves and Eye protection<br>Refer to SWP on Manual Handling<br>SURHSE1.02 Manual Handling | |
| 6 | Adjust pressure relief valve check relief valve pin is the correct pressure<br>Calculate displacement | Personal injury hand tools | 17<br>Significant | WARNING<br>**Ensure Relief valve pins or adjustment is set at 600 PSI. `**<br>**Calculate capacity of mud tank.**<br>Volume(SQ/RECT) = Length x Width x Depth<br>= ??? meters cube<br>= ??? x 1000<br>= ??? litres | |
| 7 | Mix cement | Personal injury cement burns | 17<br>Significant | Wear correct PPE Gloves Safety Dust Mask and Eye protection ·<br>Read MSDS on chemical being used.<br>Refer to SWP on Manual Handling<br>SURHSE1.02 Manual Handling<br>**As a guide 2 kg cement and 1 lt of water will produce 1.65 lts of cement slurry.**<br>Mix and circulate cement.<br>**As an guide add one to two percent Calcium Chloride once cement has been mixed.** | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

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|---|---|---|---|---|---|
| 8 | Connect cement head and pump required amount of cement down the hole | Personal injury cement burns<br>Hose blows | 17<br>Significant | Wear appropriate PPE<br>Volume hole = .785 x diameter² x depth<br>WARNING<br>**Ensure relief valve is set to required pressure and hoses are rated for the task**<br>SWP SURAIR 3.15 Assemble/Remove High Pressure Hose<br>SWP SURAIR 3.17 Hose Maintenance | 8<br>Moderate |
| 9 | 1: Release pressure and disconnect cementing heady Place rubber plug in rod string.<br>2: If cement head is of the type with the rubber plug inserted inside and held by a pint Remove pin and screw bung in to the hole. | Personal injury | 12<br>Moderate | WARNING<br>**HIGH PRESSURE HOSES CAN RESULT IN SERIOUS INJURY OR EVEN DEATH.**<br>Ensure pressure is vented off.<br>SWP SURAIR 3.15 Assemble/Remove High Pressure Hose<br>Read MSDS on chemical being used.<br>Refer to SWP on manual handling<br>Gloves and eye protection | |
| 10 | Pump down displacement water<br>Noting:<br>1. Displacement of water is achieved | Hose blows<br>Personal injury<br>Miscalculations | 17<br>Significant | WARNING | 8<br>Moderate |

AUSTRALIAN MINERAL & WATERWELL DRILLING

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|---|---|---|---|---|---|
| | 2 Cement returns<br>3 Plug reaches pressure of between 400 to 600 PSI | | | **Ensure relief valve is set to required pressure and hoses are rated for the task**<br>SWP SURAIR 3.15 Assemble/Remove High Pressure Hose<br>SWP SURAIR 3.17 Hose Maintenance<br>Wear correct PPE Gloves and eye protection<br>Read MSDS on chemical being used. | |
| 11 | Shut off pump<br>Note holding pressure | | | | |
| 12 | Wait on cement to set | | | | |
| 13 | Wash all tools and work area thoroughly after cementing. | | | SWP SURHSE 1.04 Housekeeping tools.<br>Ensure cementing pumps are thoroughly cleaned.<br>WARNING<br>**HIGH PRESSURE HOSES CAN RESULT IN SERIOUS INJURY OR EVEN DEATH.**<br>Ensure pressure is vented off.<br>SWP SURAIR 3.15 Assemble/Remove High Pressure Hose<br>Read MSDS on chemical being used.<br>Refer to SWP on manual handling<br>Gloves and eye protection | |

AUSTRALIAN MINERAL & WATERWELL DRILLING

# STANDARD WORK PROCEDURE

**No: SURDIA5.01** **Prepared By: Vaughan Cullen**

**Title: Running/Pulling and Seating Casing and the Start of the hole-Haul Plug** **Approved By: Vaughan Cullen**

**Revision Date: 11th Oct. 2010 Reviewed By: Lawrie Lorrigan**

| *STEP* | *SPECIFIC JOB STEPS* | *HAZARDS WITHIN THIS STEP (Safety and Environmental)* | *RISK LEVEL SCORE* | *HAZARD CONTROL ACTIVITY REQUIRED* | *RESIDUAL RISK SCORE* |
|---|---|---|---|---|---|
| 1 | Calculate case off point | Incorrect stickup | 15<br>Moderate | Follow SWP SURGEN 2,26 Calculate Hole Depth<br>If necessary measure all casing before drilling stops<br>Have knowledge of short rods on site<br>Don't forget to include the shoe bit in your calculations | 4<br>Low |
| 2 | Pull drilling string out of the hole | Personal injury<br>Equipment damage | 22<br>High | **Read and follow these SWP's**<br>SWP SURDIA 5.17 Add/Remove Rod With Clamshell<br>SWP SURDIA 5.11 Pull and Run Rods Hoist Plug | 4<br>Low |
| 3a<br><br>3b | Place head plate on head and traverse up fully and rack back.<br>Engage plug slide out to required distance.<br><br>Reverse truck in position with loaded casing. | Personal injury — rods falling<br>Equipment damage | 22<br>high | Never attempt to pull rods over head which is not racked back.<br>Gloves to be worn<br>HR License required<br>Pre-start inspection<br>Adjust mirrors to required angle<br>Have at least one spotter to guide you back<br>SWP SURHSE 1.10 Vehicle Daily Inspection | 8<br>Moderate |
| 4 | Screw pulling plug into casing and connect winch cable | Personal injury - back strain | 17<br>Moderate | Follow safe manual handling procedures<br>Pre—start Inspection.<br><br>WARNING<br><br>**Check lifting equipment for condition, rating, fatigue, broken wires, birds nesting, kinks from over running on the drum, sound of the winch, sloppy levers** etc**.**<br><br>At no time shall any body part come between the moving rod and any stationary object. Ensure winch rope and hoisting plug and threads on sub are in good condition.<br>Ensure clevis pin is in good condition.<br>SWP SURGEN 2.13 Main Winch Operation | 4<br>Low |

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|---|---|---|---|---|---|
| 5 | Before raising casing tighten shoe bit, clean thread and screw on shoe bit tighten with stilsons. Raise casing with winch until it is in the plug slide off the mast | Personal injury | 21<br>High | WARNING<br>**Raise casing at controlled speed easing off on the lever as the rod pin nears the end of the sloop/rack.**<br>**Never stand under suspended load.**<br>**Maintain good communication**<br>**Ensure good balance of the offsider as the rod approaches**<br>**Watch the haul plug at least until it clears the head and monitor the spooling on the drum**<br>Follow correct manual handling procedures<br>Follow good housekeeping policies<br>SVVP SURGEN 2.13 Main Winch Operation<br>SVVP SURGEN 2.19 Stilson Use<br>Gloves to be worn | 7<br>Low |
| 6 | Adjust the plug slide to the best position in relation to the hole.<br>Offsider guides the rod as it goes through clamps and into the hole.<br>Lower rod and close clamps.<br>Undo hauling plug | Personal injury - hands | 20<br>High | Ensure all pressure in rod string is released before attempting to remove pulling plug.<br>Ensure toe guard is in place.<br>Follow correct manual handling procedures | 7<br>Low |

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|---|---|---|---|---|---|
| 7 | Lift hauling plug slightly then lower as the offsider guides it to the next casing rod. Screw the haul sub into the rod all the way. Lift the casing red ensuring that hazard controls are met. | Personal Injury | 21 High | WARNING<br>**Raise casing at controlled speed easing off on the lever as the rod pin nears the end of the sloop/rack.**<br>**Never stand under suspended load.**<br>**Maintain good communication**<br>**Ensure good balance of the offsider as the rod approaches**<br>**Watch the haul plug at least until it clears the head and monitor the spooling on the drum**<br>**Never place fingers inside rods or position your hand lower then 300mm from the top of the pin.**<br>Follow correct manual handling procedures<br>Follow good housekeeping policies<br>SWP SURGEN 2.13 Main Winch Operation<br>SWP SURGEN 2.19 Stilson Use<br>Gloves to be worn | 7 Low |
| 8 | Check, clean and grease all rod threads | | | Rods to be checked for belled or damaged threads. Threads to be cleaned with wire brush. Pin end greased with thread grease. Box end lightly oiled. Rods shall be counted and the number recorded before lowering into hole. Ensure hoisting plug is made up hand tight in next rod.<br>Driller to watch box end of rod and offsider to control pin end as it is pulled off the rod rack,<br>SWP SURHSE 1.02 Manual Handling<br>Read MSDS on chemical used | |

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|---|---|---|---|---|---|
| 9 | Screw up thread and torque to required pressure | Personal Injury tool slips | 16 Moderate | WARNING<br><br>**If screwing the rod by hand the driller must ensure the rod is held central in the mast by working the winch that the rig is level, mast is at the angle of the hole and that gloves are worn.**<br>UDR 1000 and 1200 rig where the rod spinner is not used ensure the foot plate is inserted so the offsider can place their right foot on the foot plate and left on the deck, maintain a straight back, hands positioned at a comfortable distance apart and then screw the rod. If the rod is tight or cross threaded they must stop and use stilsons.<br><br>UDR550 where a foot plate is not applicable the offsider must stand at a comfortable distance from the rod with feet apart, a straight back ,hands positioned at a comfortable distance apart and then screw the rod. If the rod is tight they must stop and use stilsons.<br>If using a rod spinner and the rod needs to be manually unscrewed follow steps for UDR 650 to remove rod.<br>Follow correct manual handling procedures<br>SWP SURHSE 1.02 Manual Handling<br>Pre—start inspections on lifting and rod handling equipment.<br>Correct stilson use<br>SWP SURGEN 2.19 Stilson Use | 4 Low |

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|---|---|---|---|---|---|
| 10 | Take weight with winch and open foot clamps by gently taking the slack on the rope and opening the clamps not skull dragging the rod through the clamps.<br>Lower the casing rod and repeat until a Casing is in the hole.<br>WARNING<br>**It may be noted that if the casing Hangs up while running with the winch that you will need to revert to running the casing with a clamshell as per SWP SURDIA 5.17 and flushing the hole as you run in.** | Personal Injury – cable breaks | 22<br>High | Stand clear when cable is under load<br>At no time shall any body part come between the moving rod and any stationary object.<br>Do not reef on the winch rope as you take the weight and open the clamps<br>Ensure clevis pin is secure<br>PPE<br>SWP SURDIA 5.i7 Pull/Run rods and casing with a Clamshell<br>Ensure all water taps are positioned correctly<br>Ensure all pumps are primed and tanks full of water<br>**Ensure all pressure is released from the rod string before undoing any threads**<br>**If the haul plug is hanging up, continuing can cause the casing to sludge up.** | 8<br>Moderate |

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|---|---|---|---|---|---|
| 11 | Seat casing:<br>Rod connected to the head<br>Flush hole to last rod ls at the foot clam Level.<br>Close clamps and release pressure.<br>Unscrew rod with the slow rotation lever.<br><br>WARNING<br><br>**Slowly engage rotation**<br>Lift up head and add the casing short Flush casing to bottom with water, drilling fluids and slow rotation.<br>Once the bottom of the hole has been Located as per calculations and a general rise in pressure pull back stop rotation. Shut off pump<br>Release pressure in the string and clamp.<br>As to break out the thread between the short and the casing.<br>Undo the thread one turn open clamps and lower the casing on the bottom.<br>Slowly unscrew the thread ensuring the Correct thread is undoing | Personal Injury<br>Equipment damage | 20<br>High | Ensure that the water ls at the bottom of the shoe before rotating the rod string down.<br>Mix a heavy brew of mud dependant on your drilling conditions to pack around the casing.<br>Follow SWP Mix Mud<br>PPE to be worn<br>Ensure all pressure is released before un doing any threads<br>Correct manual handling procedures | 4<br>Low |

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|---|---|---|---|---|---|
| 12 | Pulling Casing;<br>Connect short rod and screw in to the casing to the required pressure (100 B in high gear) using the head<br>Free casing if necessary and pull back<br>Join and clamp.<br>WARNING<br>**Never use the winch and haul plug to Free and pull the casing off bottom**<br>Release any pressure and remove shor | Personal Injury<br>Equipment damage | 22<br>High | Ensure water/air pump is turned off and vented<br>Ensure all personnel are not with in the vicinity of the rotating rod<br>Follow correct manual handling procedures<br>Use back up stilsons<br>WARNING<br>**Never engage fast rotation to make or break threads** | 8<br>Moderate |
| 13 | Casing free and off bottom:<br>Lower winch and screw into the casing<br>Pull back to next join and clamp | Winch over running on the drum.<br>Red and winch caught in the head<br>Equipment damage | 22<br>High | Ensure toe guard is in place<br>Offsider shall be clear of the area of the foot clamps.<br>Ensure that you watch the haul sub go over the head and the winch is spooling correctly<br>Ease off on the winch rope speed as the join comes through the clamps.<br>Ensure drill string is secure in foot clamps before slackening winch rope.<br>PPE | 8<br>Moderate |
| 14 | Release weight from winch cable | | | | |
| 15 | Break thread with Stilsons, Safety spin or Auto Breakout | Personal Injury – hand tools | 20<br>High | Pre—start inspection<br>Correct use of stilsons<br>Correct lifting procedures<br>SWP SURGEN 2.19 Stilson Use<br>SWP SURGEN 2.20 Using Breakouts | 4<br>Low |

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|---|---|---|---|---|---|
| 16 | Undo thread | Personal Injury - hands | 20<br>High | WARNING<br><br>**If unscrewing the rod by hand the driller must ensure the rod is held central in the mast by working the winch, that the rig is level, mast is at the angle of the hole and that gloves are worn.**<br>UDR 1000 and 1200 rig where the rod spinner is not used ensure the foot plate is inserted so the offsider can place their right foot on the foot plate and left on the deck, maintain a straight back, hands positioned at a comfortable distance apart and then unscrew the rod. If the rod is tight they must stop and use stilsons.<br>UDR650 where a foot plate is not applicable the offsider must stand at a comfortable distance from the rod with feet apart, a straight back ,hands positioned at a comfortable distance apart and then unscrew the rod. If the rod is tight they must stop and use stilsons.<br>If using a rod spinner and the rod needs to be manually unscrewed follow steps for UDR 650 to remove rod.<br>Follow correct manual handling procedures<br>SWP SURHSE 1.02 Manual Handling<br>Pre—start inspections on lifting and rod handling equipment. | 7<br>Moderate |

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|---|---|---|---|---|---|
| 17 | Lift rod slightly with winch | Personal injury | 16 Moderate | WARNING<br><br>**If screwing the rod by hand the driller must ensure the rod is held central in the mast by working the winch that the rig is level, mast is at the angle of the hole and that gloves are worn.**<br>UDR 1000 and 1200 rig where the rod spinner is not used ensure the foot plate is inserted so the offsider can place their right foot on the foot plate and left on the deck, maintain a straight back, hands positioned at a comfortable distance apart and then screw the rod. If the rod is tight or cross threaded they must stop and use stilsons.<br>UDR550 where a foot plate is not applicable the offsider must stand at a comfortable distance from the rod with feet apart, a straight back, hands positioned at a comfortable distance apart and then screw the rod. It the rod is tight they must stop and use stilsons.<br>If using a rod spinner and the rod needs to be manually unscrewed follow steps for UDR 650 to remove rod.<br>Follow correct manual handling procedures<br>SWP SURHSE 1.02 Manual Handling<br>Pre—start inspections on lifting and rod handling equipment.<br>Correct stilson use<br>SWP SURGEN 2.19 Stilson Use | 4 Low |